

A&B

COMPUTING FOR ACORN COMPUTERS

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July 1988 £1.50

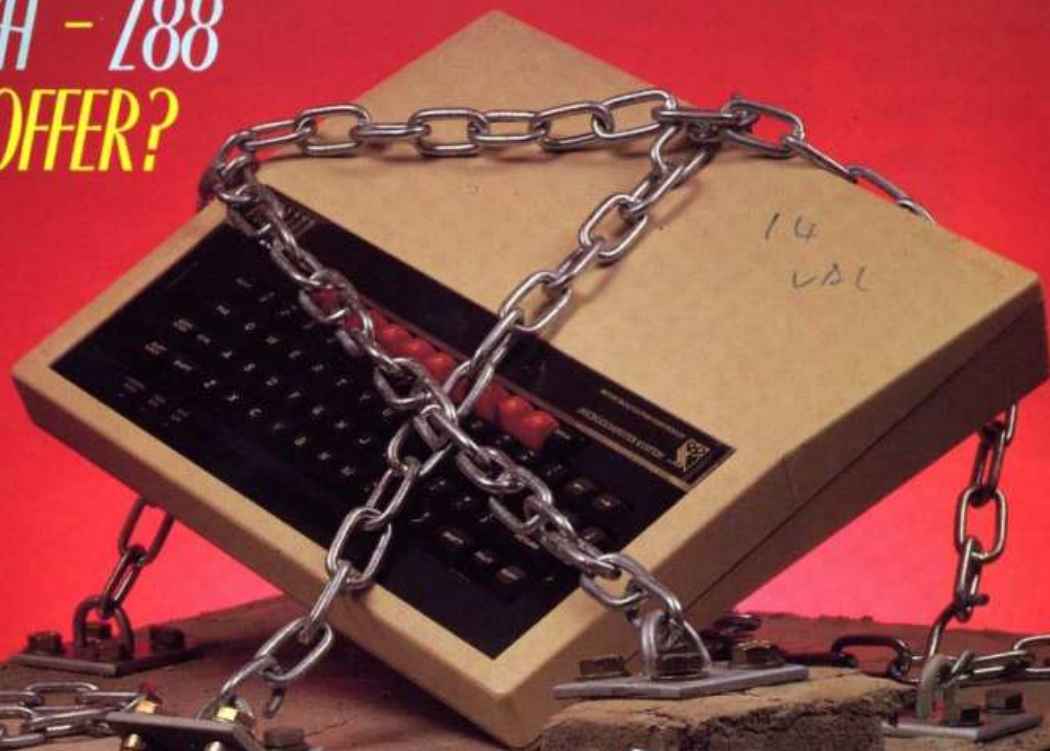
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'ARTROOM...the best there is.'
Acorn User
Feb '87

'ARTROOM is the software for you.'
A & B Jan '87

ACE consists of two programs. COLOURIZER enables you to produce MODE 1 colour versions of ARTROOM screens and to dump them to a printer using a shaded printer dump. The MODE CONVERTER program will convert any graphics screen into a Mode 4 ARTROOM screen ready for loading into ARTROOM. Conversions can be made from Modes 0,1,2,5 and 7, yes SEVEN!

'...very pleased with the way Clares have introduced the colour facility.' A & B June '87.

ARTROOM and ACE will work with any mouse but we recommend DIGIMOUSE because it is well engineered using a non-slip ball and optical encoders. DIGIMOUSE also includes the unique 'LINEAR LOCK' facility that enables you to draw straight lines freehand.

'...impressed by Nidd Valley Digimouse' A & B June '87
This complete package is marketed by Olivetti in Italy, the home of style and design.

ACE A STROKE OF GENIUS!

DIGIMOUSE



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The Beta-Base pack consists of Beta-Base, the number one database for the BBC micro, and Beta-Base Utilities which extends the power of Beta-Base.

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'We use Beta-Base ourselves'
Mike Bibby, Editor of
MICRO USER.

'Rated best value for money'—ACORN USER Dec '84

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N.B. if ordering for a Master or Compact please state DFS or ADFS. The ARTROOM pack is for the Master or Compact only but all other software is available for all machines.

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FONTWISE+ is compatible with WORDWISE, VIEW, INTERWORD, MINI OFFICE II and EDWORD II.

'FONTWISE is better than many NLQ packages'—ACORN USER Sept '86

The FONT EDITOR is very easy to use and allows you to edit the current fonts or create new ones. Reviewers have praised the editor for its ease of use and faultless presentation.

'editor is impressively quick, smooth and easy to use'—A & B
EDITOR '...puts all previous designers to shame'—BEEBUG July '86

Ask for a sample printout.



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'an ingenious collection of utilities...' BEEBUG Oct '86
'worth its weight in gold.' A & B Jan '87

MACROM is a fast full featured MACRO ASSEMBLER that allows the use of macros, which are loaded from disc. MACROM has its own easy to use editor which automatically formats your source code. A HI version of MACROM is supplied for use with the second processor. A macro library and demonstrations are also supplied.

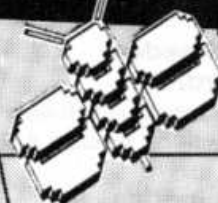
'Full marks for an excellent product.'—BEEBUG JUNE 1986

We are also making BROM+ available under this offer. Its main feature is the full scrolling BASIC editor which allows the user to edit a program as if dealing with text in a wordprocessor. There are many other features dedicated to making life easier for BASIC programmers.

'This is the best BASIC screen editor I have so far used.'
—MICRO USER August 85

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Archimedes

HARNESS THE POWER

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The ARCHIMEDES TOOLKIT was the first toolkit for the Archimedes. It is still available for £39.95 but we have improved on the original with TOOLKIT PLUS. All of the previous favourites are there:

- * 10 Fast memory and disc editors
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- * Fast scrolling disassembler
- * Memory shift, swap and compare



Plus

- * AGET & APUT disc sectors
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- * A series of commands to list all SWIs, give SWI numbers for names and names for numbers.

Plus

A host of commands to search a disc for filenames including wildcards, specified filetypes, files between specific dates or a combination of these parameters. For instance you could search a disc for all BASIC files starting with DEMO and saved between 1/1/88 and 2/2/88.

Plus

ARCHIVING so that you can backup files matching the specified criteria above. You can then archive the files on your hard disc to floppies for safety.

You need TOOLKIT+ so order today.

BUFFER MODULE £19.95

Also from Mike Shaw, the author of Toolkit+, comes a buffer module. This has buffers for the printer, serial input and serial output. Each buffer can be configured from 256 bytes upto 1 megabyte. Whilst data is being printed you can carry on working on your computer.

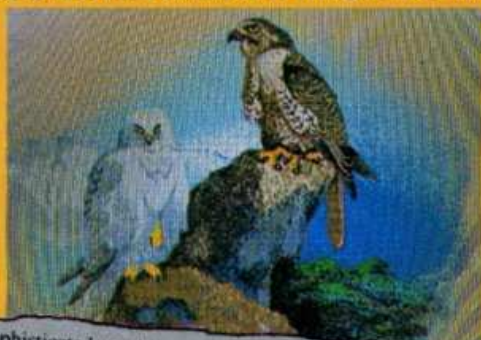
You can get control back from your printer in a fraction of the normal time. Printouts that take a printer 4 or 5 hours to print can be put in the buffer in minutes and you can then carry on working on your computer. If you want to save time get this module now.

Compatible with 305, 310, 410 and 440.

Artisan

£39.95

ARTISAN is not just an art package it is THE art package for the Archimedes. We are not going to bore you with lists of features, just take a look at the picture to see how good it is. Just to prove that we aren't the only ones who think its good take a look at what the magazines think:



a sophisticated graphics package... ARTISAN is a true load and go program... A real first for ARTISAN is it's magic brush'. Its effects have to be seen to be believed... It's friendly and foolproof... ARTISAN operates at a lightning fast speed... It's streets ahead.

ACORN USER February 1988

ARTISAN makes the Archimedes superb... a truly professional product... The possibilities are endless. I can certainly recommend ARTISAN

MICRO USER January 1988

ARTISAN is a highly superior product... very classy... the manual clearly explained all the many features... go on buy this package now.

RISC USER November 1987

deserving of special mention is a facility called Magic Brush... a true cut and paste... 'ARTISAN' wins hands down.

ARCHIVE February 1988

ARTISAN represents excellent value for money... superbly designed pop up menus... very friendly, foolproof and quick to use... incredibly easy to use... Instantly appealing... superb features... the Magic Pen is unique to ARTISAN... Quantel would have been justified in getting a little upset... well organised...

A & B December 1987 & January 1988

ARTISAN SUPPORT DISC £19.95

Enhance the power of ARTISAN with this support disc containing many useful new utilities plus additional screens and fonts. Features include:

* **DISPLAY** module to create your own slide show' with 8 standard or user defined fades. The fades are used to merge one picture into another just like TV. You control the speed of the merge and you can even design your own fades with the supplied definer.

- * **INTEGREX** colour dumps-one standard and one high quality
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- * **ADDITIONAL** fonts & screens

All the utilities work with any Mode 12 screen and so you are not limited to ARTISAN screens.

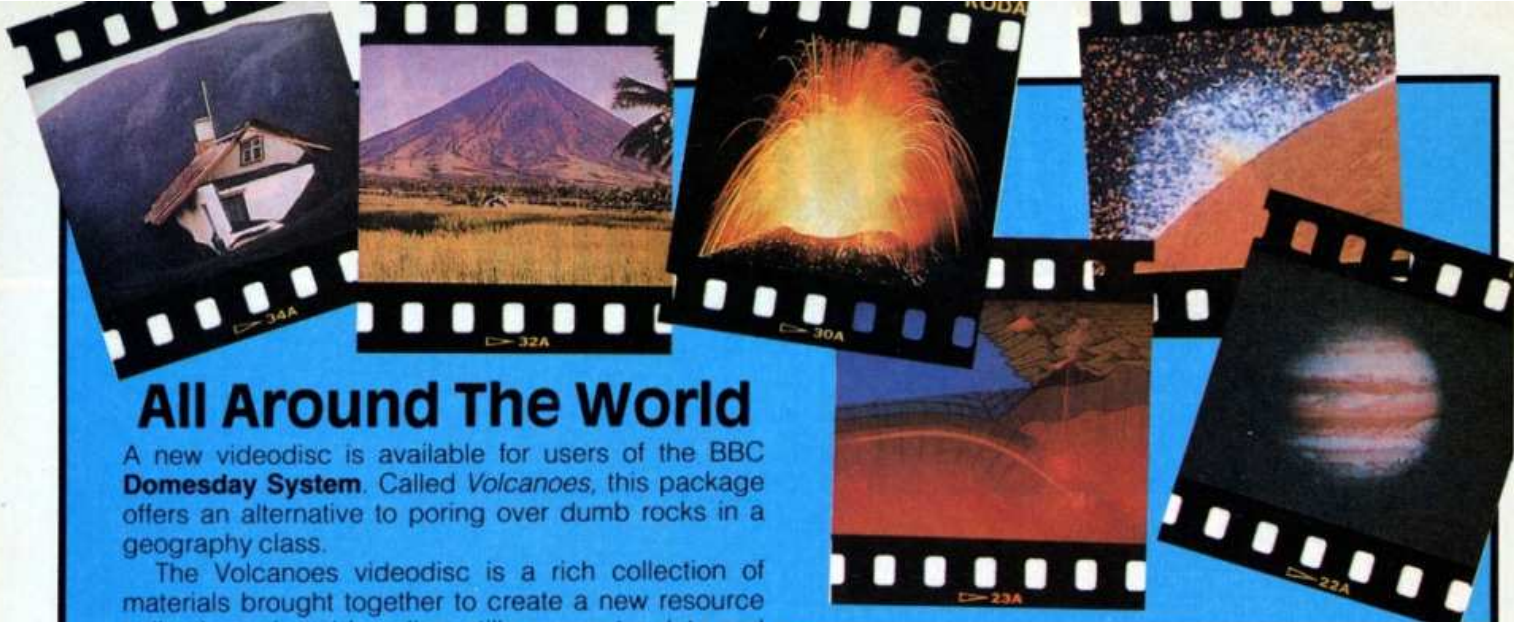


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All Around The World

A new videodisc is available for users of the BBC **Domesday System**. Called *Volcanoes*, this package offers an alternative to poring over dumb rocks in a geography class.

The *Volcanoes* videodisc is a rich collection of materials brought together to create a new resource collection using video clips, stills, computer data and commentary to pull together what must be one of the most comprehensive tomes relating to Geology's most powerful force in nature.

The disc is utterly fascinating, pulling complete records of Mauna Ulu (the sleeping Volcano), Iceland's Eldfjall, The famous Mount St Helens, Mount Etna, Nevado Del Ruiz, and, by way of a contrast, Io – the volcanic Jupiter moon.

Naturally the subject fits naturally into the Geography or Geology classroom thus widening the BBC Master's accessibility in yet another teaching field. The *Volcanoes* team also hope to see their disc used across the curriculum – naturally support (floppy) discs and more resource material will follow in the near future.

For more information contact: Education and Training Sales, BBC Enterprises Ltd, Woodlands, 80 Wood Lane, London W12 0TT. ☎ 01 576 0521.

New software house hopes ride high for the Beeb

After a sumptuous press launch at a local Chinese restaurant, Mandarin software started off with a bang with the launch of both *Mission Icarus* and *Time and Magic* for the BBC Micro.

"Time and Magic is just the start of many quality games", a very attractive representative told me, "we aren't so much interested in releasing a game every month, but what we do release,



memory, and IMD to 'take back' wrong moves). You are in your own living room, surrounded by the usual clutter of books, mugs, half-full cups of cold coffee and the remains of yesterday's lunch. Your hi-fi is blaring out a very loud remixed noise, and the cat is asleep on the top of the fish tank. All is well with the world. You can see a fine hourglass on the mantelpiece and a picture of a kindly old man.

BBC Master 128K - Time and Magic - Demonstration

Okay, so I prepared myself for the worst, the Amiga Version and the Atari ST were exactly the same as each other, the Commodore 64 version was "chunky" to put it politely, but when they unveiled the Master version, I must admit to wanting to look under the case of the Master just to make sure that the game was running on a Master computer!

we want to do it properly".

If that isn't a strong enough recommendation we will have a closer look in a future issue of A&B Computing – watch this space.

A&B welcomes Mandarin software to the Beeb market, we hope you do well.

NEWS

Snake Bite

In the past we have been pretty enthusiastic about the **Peripheral Manager** range of printer sharers for the Beeb, and Adder Technology (Adder publish the BBC Micro Advanced User Guide) have come up with a very nice looking product here.



The **PM-8**, as Adder so adventurously call their new Peripheral Manager is an 8 port configurable unit allowing from two to sixteen users to be hooked up to each other. By buffering up to four Megabytes of data, Adder say they can supply units in various buffer sizes from 256K (yawn) to a very impressive looking 4 Megabytes.

This is where things really start getting interesting though – Unlike Econet, you can hook on just about any computer supporting an RS232 serial and Centronics supported device and if you find that that is not enough to offer to compete with networking stations, then there is a Split mode, whereby users can hook up two RS232 devices to share one RS232 interface – neat huh?

The price is probably going to scare off most single users, but for offices and networks the PM-8 seems to offer a great deal for your money, well, at least the more expensive units do!

The basic PM-8 unit for the Beeb costs £345 plus £32.50 per port, memory costs £100 for a 256K unit, but 2 megabytes of memory costs £795.

Contact Adder Technology at: Cambridge Science Park, Milton Road, Cambridge, CB4 4GF.
☎ (0223) 861 912.

BEEBUG

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Master and Compact

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For Archimedes
users

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- An Acorn appointed specialist support and service centre.

BEEBUG

The magazine is now in its sixth year of publication with 20,000 subscribers throughout the world. Its proven format has been invaluable to serious BBC Micro and Master computer users in the home, education and business.

Each issue of BEEBUG provides 72 pages of articles, programs (utilities, applications etc), tutorials, workshops, reviews, hints & tips, news and information to beginners and experts alike. All our programs are tested on all versions of the BBC Micro, and are also available monthly on disc or tape.

RISC USER

This is the magazine for anyone interested in Acorn's RISC computer, the Archimedes. Launched at the same time as Archimedes, RISC User provides lively and informed coverage of what's happening in the world of Archimedes.

Reviews, hints, programs and articles are all specifically written for Archimedes, showing how to exploit the many features of this sophisticated computer. RISC User is all about the Archimedes, it does not contain modified programs originally intended for the Model B or Master.

BEEBUG and RISC User are both published 10 times a year and are only available on subscription, not through the shops.

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A310M Base	£96.25	£96.00	A440 Base	£267.85	£264.00
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A310M Colour	£119.25	£119.00	A440 Colour	£290.85	£287.00

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We will be pleased to accept your old computer (in working condition) as part exchange towards the purchase of an Archimedes. (If you use the finance scheme this will replace your initial deposit on a 305/310, so you pay nothing now). Allowances are as follows:

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BBC Issue 7 DFS (Or B+)	£225
Master 128	£250
Compact Base System	£215

Please phone for allowances on other Compact and Master systems.

3 FREE PC EMULATOR OR ON-SITE MAINTENANCE

Join RISC USER, the Archimedes magazine and support group, and purchase your Archimedes by Cheque, Access, Visa, Official Order or 11.5% finance and we will supply you, absolutely free, 10 3.5" discs, a lockable disc storage box, printer lead and the latest version of The PC Emulator from Acorn. Alternatively we will provide 1 year on-site maintenance for your Archimedes absolutely free (8 hour call out guaranteed).

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I enclose a cheque value £.....

Please debit my Access/Visa/Connect Card No

Expiry...../..... with £.....

Name

Address

Signature

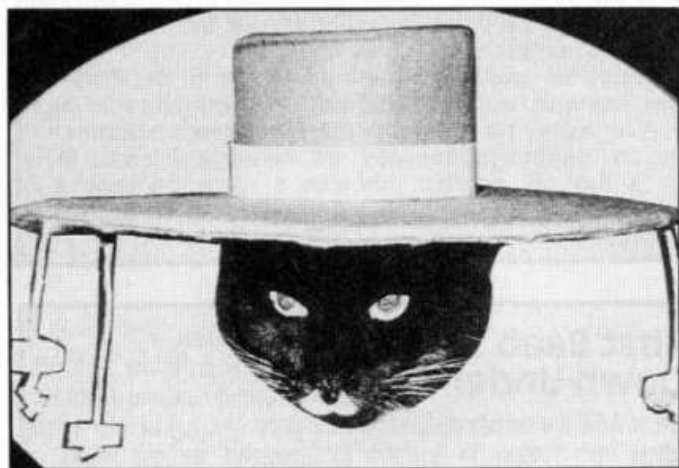


Stupid Press Release from Superior (part 2)

As depicted on the back page of last month's A&B Computing (sometimes I think it's the advertising department that get the news before Editorial) comes this really dumb picture of a cat wearing a hat sporting three (count them) hastily drawn-in corks on strings.

The reason behind this is to promote their latest game for the BBC B and Electron called **SpyCat** and their latest competition which is, as usual, something really useful – a £100 espionage kit.

Perhaps they should use it to find out what the reaction to stupid photographs like this really is – never mind Superior, you got into the news pages (albeit uncomfortably).



Rhythm King

Rice Electronics have extended their add-on *drum machine* for the BBC Micro with a unit which produces both drum and bass guitar sounds; the instruments are produced separately and can be input into a recording device, sound mixer or amplifier.

The bass guitar is programmed in sequencer style. The drum display contains the addition of a bass line at the bottom of the screen. The notes are entered by pressing the appropriate keys, in either program mode or real time. This principal applies to the drum programming too. You can either position the cursor and insert a note into the sequence or you can hit a key representing the note (or percussion sound) as the sequence plays.

The unit plugs into the user port of the BBC and provides *sampled* percussion and bass sounds which are not far off the standard obtained in specially developed drum machines available at twice the cost. Indeed there are more sounds available than on a standard drum machine.

The software too is designed around the successful drum machine formula. Rhythm patterns are programmed and saved in memory and can then be strung together into tracks (songs). Both patterns and tracks have to be saved at the end of a session but the availability of floppy storage scores over the conventional drum machine, enabling much larger song libraries to be built up.

You can get full details from Rice Computer Electronics, PO Box 2, Morecambe, Lancs, LA4 4PP.

Telesoftware – with a Difference

Owners of a Teletext adapter will now be able to keep tabs on share prices and trading fluctuations a little easier by using an interesting package from Citymagic Associates, called *Sharematic II*.

I get the feeling this is one of the first really *useful* facilities to come out of the new ATS ROM's programmable functions, certainly I haven't seen interactive software such as this since CEEFAX's "Recipe Planner" but then, erm, it's not really in the same league is it?

It needs a BBC Micro and a Teletext Adapter and takes data and pages down from the 168 share prices FT30 and FTSE100 analysing them and computing possible outcomes of a days trading results.

The end result is a whole host of pretty looking graphs and charts printed out using an Epson

MX, RX or FX80 printer, looking suitably detailed enough to be of some use to high tech yuppies and, of course, serious share owners, Economists and Economics Teachers, describing the way the stock exchange works, from the comfort of a classroom.

The package works with either the Acorn or Morley Teletext adapters, so long as it has the ATS ROM chip installed.

The package costs £39.95 and seems to need an 80 track disc drive system – a data disc containing the past 500 days trading information is also available from Citymagic at a price, and it saves having to wait days before being able to make any useful sense out of the data.

Contact Citymagic Associates at: 40 Manor Road, Goldington, Bedford, MK41 9LQ. ☎ (0234) 856050/67067.

Music 87 Scrapped as Lawsuits Fly

Poor old Peartree Computers, the people behind what seems like one of the oldest, and longest running, April fool jokes ever, have decided to completely scrap the Music 87 synthesiser, just months after deciding *not* to release the BBC model B version after all.

Which is a good thing really judging by the quality of the software I received! To say that the ASA had a point when pulling this company into line after a number of public complaints was an understatement, but that's another story...

Hybrid Technology, the designers of the Music 5000 system have very kindly announced a rescue package for purchasers left in the lurch – many who ordered the Music 87 last year, received a rebadged Music 500 (the precursor to the Music 5000) with a

promise that the software would follow, this was a promise that Peartree never honoured, because the programmers, Dinosaur Software ran into huge difficulties.

Hybrid's Chris Jordan hopes to offer a complete conversion of the Music 87 to the vastly superior Music 5000 system which includes the AMPLE Nucleus ROM, the Studio 5000 software and a one-year guarantee thus making it compatible with all existing hardware devices – he said, "as soon as the situation on refunds to customers is clear, we'll be able to finalise details and set a price".

If you were "had" by Peartree, then contact Hybrid on ☎ (0223) 316910.

A full review of the Music 2000 MIDI interface for the Hybrid Music system appears as part of this month's music special.

Back Issues Photocopying Service

Internal news item now ladies and gentlemen. ASP Readers Services are able to offer a photocopying service for articles in magazines that are no longer available from back issues.

The price is £1.50 for each individual article, and 15p for

each additional page thereafter up to a maximum of £7.50.

For the photocopying service, please send your cheques made payable to A.S.P Ltd, and send them to 9 Hall Road, Maylands Wood Estate, Hemel Hempstead, Herts, HP2 1BH.

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Tandata Teleport For Data Broadcasting

The Tandata Teleport, a dual service data broadcast decoder, developed by Tandata cable & Teletext, a division of Tandata Holdings plc, was on show at the Videotext User earlier this year.

Data broadcasting, which uses the spare capacity on television transmissions, is proving a highly effective means of distributing information to large numbers of remote users.

The Teleport operates to the world system teletext standard – compact and easy to operate it is able to receive transmission from both the BBC's Datacast and IBA's Aircall services. It gives complete flexibility in the way it can be used with configurations to suit every application. It can be provided either as a standalone unit or built into existing display devices.

Data broadcasting solves the problem of distributing information instantly, simultaneously and in complete security, to any number of sites. New recipients of a service can be brought on-stream overnight and the Information Provider is in complete control of which site does, or does not, receive any given data. The service is thus ideal for a wide variety of applications. For example, retail outlets can receive up to the minute information on stock and pricing levels, directly into the electronic till. Or new promotional information and messages can be instantly and automatically sent to the electronic displays at outlets on a national or regional basis. New tariffs can be sent to meters, ticket-issuing machines or new passwords sent to electronic locks without any user intervention being necessary.

Data broadcast is an ideal communications medium for the distribution of financial data services. In the quiet period when money markets are closed.

Background information such as lists of securities, company names, historic price movements, etc., can be broadcast straight into the memories of specially equipped terminals or computers. During the active periods of market trading, smaller amounts of data reflecting price movements can be broadcast. These are received simultaneously in every subscriber's terminal, wherever located, and within fractions of a second of being broadcast.

The Teleport can function in any one of three configurations. The first method enables it to work with a PC or data terminal allowing Information Providers to supply their customers with a Teleport specifically adapted to receive a particular subscription service.

The second is where the Teleport is supplied with the Tandata PA data/voice communications workstation as a plint or an adjunct.

The third and final configuration regards the broadcast receiver as a pipeline, enabling whatever is sent by the provider to be received by the subscriber on a wide range of equipment including RGB screen, an LED multi-character/word display, a printer, a mainframe, or any other display/output mechanism which can be connect to an RS232 or parallel port.

For further information please contact:

● Tandata Cable and Teletext, Albert Road North, Malvern, Worcs. WR14 2TL. ☎ 0684-892421, Telex 337617, Prestel mailbox 035361163, Telecom Gold mailbox 81TAN003, Fax 0684-892422.

Dave Somers presents another monthly roundup of all that's happening in the comms scene

Another Microlink Milestone

Microlink is celebrating again. Its bulletin board has just carried its 20,000th message. This comes only six months after passing the 10,000 mark within a year of the board starting up in 1986.

"The fact that our second 10,000 was achieved in half the time of the first is an indication of how Britain's computer communications enthusiasts have taken to Microlink", said head of Microlink Derek Meakin.

"And, if proof were needed, of how Microlink now operates by far the country's brightest and busiest bulletin board".

● Microlink, Europa House, Adlington Park, Adlington, Macclesfield SK10 5NP. ☎ 0625-878888, Telecom Gold mailbox 72:MAG001, Fax 0625-879966.

Telemap Group Launches Computerised Conference Centre



Telemap Group has launched *TeleTalk*, a teleconferencing (real-time, multi-user conversation) service for home computer users – initially only available to Micronet members – and is developing a business version for launch later in the year.

TeleTalk allows users to gain control of an on-line "room" on the TeleTalk computer and hold live conferences or discussions on the subject of their choice.

The organiser (*keyholder*) can control a conference by using such commands as CLOSE/OPEN DOOR (of room) and ADMIT (user). A noticeboard facility allows public conferences to be set up with time, venue and subject displayed. Breakaway and private meetings can also be arranged in one of the thirty rooms available.

Teletalk allows up to sixty-four users to attend a conference at any one time. The service, which costs 3pence a minute for

Micronet members, operates on a dedicated mini-computer.

TeleTalk will be launched onto the whole of Prestel later this year.

A version of the teleconferencing system designed with business users in mind is also under development. This service (which will have a different name) is planned for launch on Telecom Gold later in 1988.

Phil Godsell, Product Manager for Teleconferencing, commented,

"On-line teleconferencing offers tremendous potential – both as an entertainment form and as a serious business tool. We fully intend to support both markets with products tailored to suit the needs of the user."

For further information please contact:

● Telemap Group Limited, Durrant House, 8 Herbil Hill, London EC1R 5EJ. ☎ 01-278 3143, Fax 01-833 4136, Prestel mailbox 223681485.

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POSING A PORTABLE



PROBLEM

Buying a portable computer for your Beeb? Read this from an experienced portable-computer using hack!

Question: You have three portables, each with a £200 difference between them; they are all capable of working extremely well with the Beeb, and they are all fairly much the same when it comes to running applications software – is the Z88 the only portable computer for the BBC? Not likely!

If you travel between the hours of 18:00 and 22:00 from Paddington to Oxford, you may come across somebody typing away at their portable computer. His tapping means he is working on a copy of A&B Computing (or at least one of the associated tasks that come with Editing a magazine). He may be the only person on the train to do this, but he is not the only person to have taken up portable computing as a way of getting work done – traditionally in unworkable areas, namely a crowded commuter train.

You may well have read the Watford Electronics advert in this magazine regarding the Cambridge Z88 portable computer. You may have read the enthusiastic response I gave the machine when I reviewed it back in January 1988! It seems that the Z88 has been

welcomed with open arms by the huge fraternity of BBC Micro users as the machine that Acorn should have made – Acorn never got round to doing this, even though there were rumours that the Communicator (a sort of 16 bit BBC Micro) was to have sprouted an LCD screen! But this was, as time passed, just idle rumour.

The Z88 is uniquely British, it has an irreverence regarding the world of portable computing, and the price/performance ratio is extremely high, you get a lot of memory and a lot of software for your money. The fact that it has been openly designed as an alternative computer – a support machine, instead of a fully blown computer system is, in my mind, part of the reason behind the Z88's success.

Which is a bit of a shame really, as the expensive and over-priced market of MS-DOS "compatibles" and IBM "luggables" leave a lot to be desired, but then there are a lot of machines out there – it really is a case of "you pays your money and you takes your pick" with this end of the portable market.

But at the other end, the small LCD based portables, there is an all-out price war in order to clear ageing stocks of old machines. NEC and Epson both manufacture a CP/M based portable with around 64K of memory, and their prices are dropping regularly! Easy pickings if you are on the lookout for any portable computer.

The end result is chaotic, but the prospective portable purchaser can clean up on a nice new portable computer for just over £200

armed to the hilt with software, manuals and, if you are lucky, a three month warranty to boot.

Of course the disadvantages of buying last years' model are obvious – you will get little or no customer support from the manufacturer (unless you are very lucky). Limited software availability after your initial purchase, and, of course the complete incompatibility with your existing BBC Micro equipment. It won't be a case of shoving in a disc and expecting to read the disc first time I am afraid. Heck! some of these portables don't even come with a disc drive! But I'll get on to that later.

Software

The question of software is something Cambridge Computer got right first time, they cleverly decided to take a standard word processor, build an operating system around it, shove in a "sort-of" windowing environment, and call it an integrated suite – which it is!

Pipedream – as the software is called is a marvel and a testament to what can be done with a humble Z80 processor – of course a great deal of the work is done by the VLSI support chips that are processors in their own right.

Communications is something of a let down as far as turning the Z88 into a terminal is concerned. The software to link the BBC Micro is, however, excellent – I am aware of a number of software houses creating terminal packages for the Z88! That there are software houses out there supporting this portable machine is reason enough to look very carefully at the Z88 instead of a MS-DOS portable or PC luggable.

On a portable computer you will need plenty of good comms software if you want to use your machine as a notebook with which to write your ideas on and then transfer them across to a BBC Micro. CP/M machines are normally badly supported when it comes to this, although the Epson PX-8 and the NEC 8401a portables both have excellent VT52 emulation. Most CP/M machines stick with the thoroughly unsuitable PIP interchange program – The Cambridge Z88 (as it stands) is better supported than these machines, but I have still yet to see a terminal package that, for the price, does as much as the Telecom package in the NEC portable.

How Do I Choose?

Have a look around! These so called state-of-the-art machines are probably okay, but only if you really need MS-DOS compatibility. A disc drive is pure indulgence unless you specifically need a machine that you want to transport vast amounts of data to and from (and I mean more than 100K or so).

Choose as large a screen as possible (something the NEC portable has over the Z88 and the Epson PX-8). A plasma screen is a power greedy best that needs either direct interfacing with the mains, or a very short battery life, there is nothing more annoying

than having a portable computer run out of power on a train with no spare batteries!

A good battery life span from, say four type C batteries is about eight hours – that's flying from the USA to Great Britain (or from Liverpool to London – twice). A battery backup independent to the power supply is important, and the RAM disc must be maintained for a good day or two after power failure.

Connecting the portable to a BBC micro never really poses much of a problem, if you know what you are doing. I have *Modem Master* set up on the Winchester at work and on my machine at home, so that files can be easily transported from one machine to another. Special software (as in Cambridge Computer's Z88 to BBC Link) are okay but if you know a little about communications, then any software package will do – Modem packages such as *Termi* and *Commstar* are normally the best supported of this type.

Choosing a portable

Actually choosing a machine shouldn't be too difficult. Do not believe the spiel when a salesman tells you that you need XYZ compatibility, or that a plasma screen is a necessity – I have written many of my reviews and articles on trains or in the countryside, this review was actually written on the train from Oxford to London (we're passing Reading at the moment) and as soon as I get into work, I will transfer the file across to the BBC Micro.

Contrary to popular belief, my portable is the NEC model with a large LCD screen and a decent keyboard – the software is *Wordstar* and *Calcstar* plus a few extras I ported across from my Z80 system at home, (remember this is CP/M, you can do that), it weights quite a bit, it is not a state of the art machine, it doesn't have a disc drive, but it does have a good screen, good software and a good set of interfaces including an RS232 port a built in Modem, a printer connector (accepting the BBC Micro's printer leads) and a cassette interface.

The machine has only 64K of RAM Disc, and, to be quite honest, It is far better than say the bondwell PC compatible as it is less power greedy and offers more or less the same facilities, but at an incredible saving, it cost me £250 all in and it is quite possibly the most used computer in my ownership.

For the Beeb owner, the portable doesn't have to have BBC BASIC, unless you are a complete masochist, thanks to the BBC Micro's excellent communications facilities, just about any portable will do, a built in modem is a nice feature, but with an RS232 interface I have quite happily got a Watford Apollo Modem up and running.

I would honestly recommend that you do not bother sending files whilst on the move – cellular telephones installed in the first class compartments of most British Rail InterCity 125 trains are expensive, you'll need an acoustic coupler, and you'll need to go XMODEM as InterCity 125's can pass through different cellular transmission areas in a matter of minutes and any break in the flow of data will result in corrupted data.

The "other" Portable

I don't think that Cambridge Computer have much to worry about when it comes to Alan Sugar's idea of what a portable should be. The unit itself is a diabolically stupid shape and size to effectively carry about on a train or in a plane, it is *not* a laptop portable (the size of the keyboard has put pay to that) and the screen is weird to say the least.

I cannot think of much to say about this machine in its favour other than the fact that it does have very good comms facilities: one journalist said that the Amstrad portable was a Modem supplied with a computer, and he may be right – the comms facilities of both the hardware and software are excellent, but the construction of the computer is less than suitable – the hinged LCD screen has been known to lose its grip and go all floppy, the keyboard is terribly spongy – not as spongy as the Z88, but the Amstrad portable is twice the price of Sir Clive's machine – PC compatibility isn't bad though, especially when running it on a standard monitor.

Of late, I have been sending files whilst on location, this is a terrific time-saver and is certainly well worth the extra addition of a modem (should your chosen portable not have the necessary hardware).

For email (Electronic Mail) services, a portable computer is an ideal companion as you can quickly download your data as and when (or where) it becomes necessary.

Buying your portable

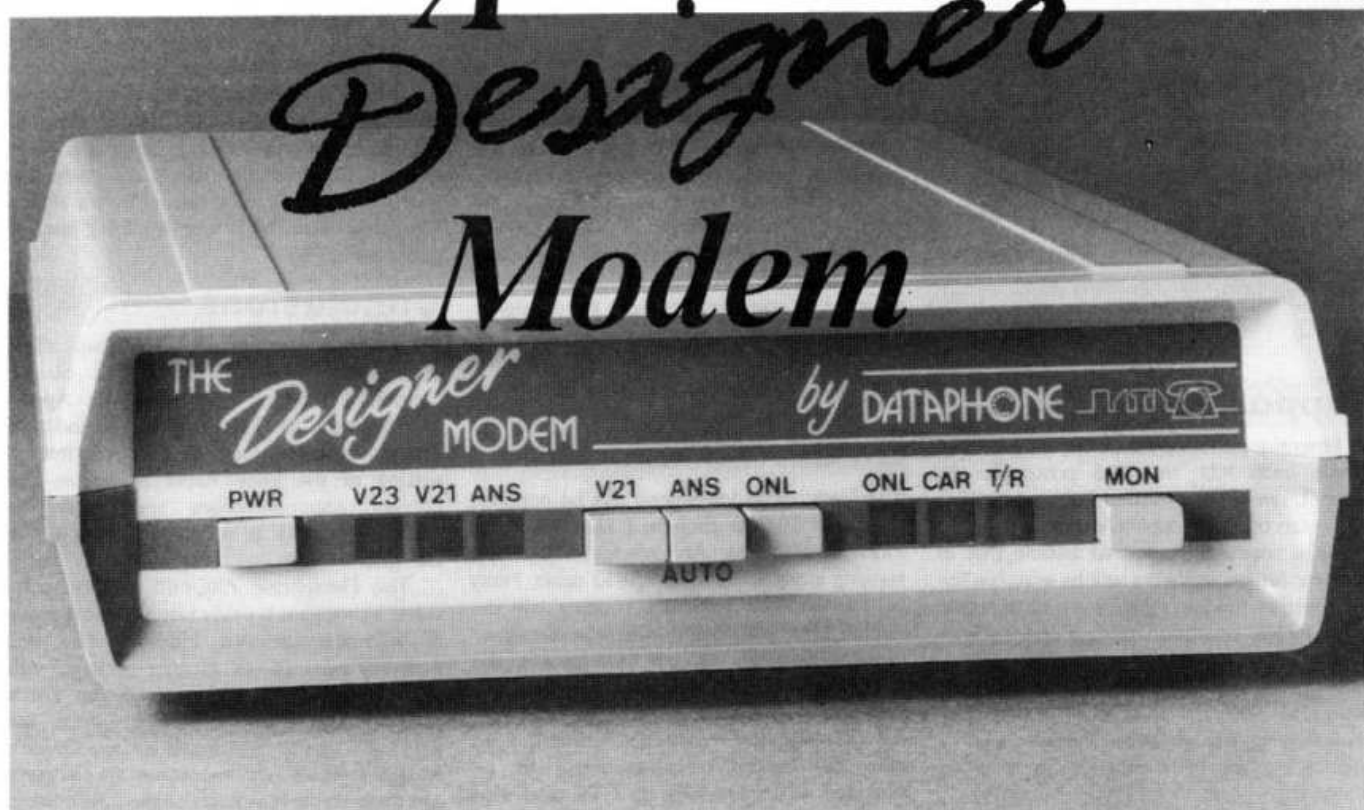
Once you have decided to buy a portable, have a good long hard think about what you really need from a machine, it may be that all you really need is a simple word processor with some software to transfer your files to the big machine at work or at home. You may want some spreadsheet operations or you may need something a little more "together" – the silicon equivalent of a Personal Organiser.

In many cases the Z88 will do as an ideal all rounder, the files are View compatible as are spreadsheets with *Viewsheets*, *Pipedream* is based on the *View Professional* package for the BBC B+ and Master series, and there is tremendous scope for connecting different devices with your Z88, and your BBC Micro.

If you want a larger screen, a real keyboard, a built in modem and a standard word processing package, then I would recommend you look at what the larger companies are offering – My NEC portable isn't light, it is power greedy, it has only 32K of RAM disc, but it does me more than adequately and is a tremendous workhorse that helps me put magazines together leaving me more time to do things the way I want to do them.

● Assistant Editor, Clive Grace has been using portable computers for four years, he has worked extensively on the PX-8, the Z88, the NEC A401A-LS and a number of PC compatibles and luggables. At present he is using the NEC for most – if not all – of his written work both in and out of A&B Computing.

A Designer Modem



Designer Jeans, Designer Shoes... now it's Designer Modems!

A few months ago I reviewed the then-latest Modem from the Dataphone stable; Called the *Demon II Modem*, it carried on as the logical successor to the original *Demon Modem*, which, in its short life, (originally called the "*Unicom*" Modem) was hailed as the ultra-cheap hackers' entry level Modem. The *Demon* was (and is) an ideal choice for first time buyers.

For the more experienced Modem user a better, more finished product exists – a number of important features not included in the *Demon II* model which, in retrospect, would have gone down well. To meet this demand, Dataphone have created what they call the *Designer Modem*, a piece of hardware that can, at will be tailored to suit your own needs and applications as, and when, it becomes necessary.

Off the Drawing Board

The *Designer Modem* looks, to all intents and purposes like the *Demon II Modem*; the same case (albeit with a stylish two-tone beige/reyn) houses the Modem PCB which is essentially the same as the *Demon II Modem's* PCB, but with a few extra components filling in the blank spaces on the board.

With the *Designer modem* fitted into

your telephone system at home or at work, It is now no longer necessary to buy a telephone splitter connector as there is a telephone socket in the back of the Modem. The *Designer Modem's* case is just large enough to act as a pedestal for a telephone on top of it, and it is small enough to put inside a briefcase – thus making it reasonably transportable.

Like the *Demon II Modem*, the power supply is actually part of the Modem itself, so you don't have to fiddle around with power supplies or the like, although the length of mains cable doesn't come ready-socketed.

Like most Modems for the BBC Micro, it connects via a short length of RS232 cable; The RS232 connection is a standard 25 way D female connector – whilst this is not the same as the BBC Micro's RS232 domino connectors at the back of the BBC Micro's case, there is a supplied cable for your chosen machine, so for the models going out for the BBC Micro/Master, a special domino to "D" cable is supplied with rugged connectors.

The front of the Modem is aesthetically pleasing. Functional and fairly sparse, the *Designer Modem* comes with a power on/off switch situated on the far left of the front fascia, next to it are three red LEDs displaying V23, V21 and their respective answer modes. If the "answer" light is not on, then the Modem is in originate mode.

Placed roughly central to the fascia are the three main control buttons; **V21** represents the baud rate at which the Modem is set. If the button is set to the "out," position, then it will be in **V23** mode. The next button is marked **ANS**, this controls the originate/answer mode settings. The last of these three

buttons is marked **ONL**, this places the Modem online (so that the signals being sent to the Modem via the BBC's RS423 port are pushed down the telephone line).

Three more LEDs follow the buttons, these are marked **ONL**, **CAR** and **T/R**. The **ONL** button is only lit when the Modem is online and when it has seized the telephone line. The second LED (again, a green one) is only lit when a carrier is received. A carrier signal that is weak will flicker, a strong carrier will light up brightly.

The last LED is a tri-state coloured LED; when data is being transmitted, the LED will be red, if it is receiving data then it will light up as green, and if the Modem is both transmitting and receiving at the same time then the LED will be yellow.

The last switch on the front panel is the **MON** button. This is used simply to monitor the sound of the telephone whilst online. The quality of the sound coming out of the tiny little piezo speaker on the Modem's circuit board is very poor, with the ordinary dialling tone being hardly recognisable, not very useful. It is, however, useful to hear how some services change carrier signals halfway through a log on sequence, and it is useful to have the Modem monitoring this, so that you can switch over baud rates and/or protocols as, and when, it becomes necessary.

When I used to hack large computer systems with automatic baud rate switching protocols for security, we used this method to fool the host computer into thinking we were legitimate users and thus gain access by simply wiring up a secondary feed from the serial connector to a small speaker (from a BBC Micro, I think).



Supported Protocols

As I mentioned earlier, the Modem itself can handle both V21 and V23 protocols. At present, very few Modems for the BBC Micro can offer full duplex V22 transmission. There is adequate reason to assume that in the near future, software will be available for the Designer Modem's hardware to simulate Half Duplex operation using Prestel Mode (1200/75) and reverse Prestel (75/1200) by flipping modes using bit 1 of the Modem's control register – this takes some nifty programming though, and will most certainly require machine code expertise in order to realise this.

Because there are switches on the front of the Modem, doesn't mean to say that the Designer Modem isn't fully automatic. Baud rate changes and all protocol switching (from V21 and V23 originate and answer modes respectively) are all controlled either by using the front panel, or by using the * commands in the Designer Modem's software.

The software is, as you may have guessed, a variant on the old Demon ZROMM package. Now almost completely rewritten, this package has gone a long way from the days when it was available on the old Unicom package sporting Jez San's code (quite possibly the worst bit of programming I have seen for the BBC Micro). All that is a thing of the past though, as the rewritten ROM now offers shadow RAM and Tube host code compatibility. The ZROMM is possibly one of the most enduring comms packages around – certainly it is one of the most popular.

An earlier version of the ROM was bundled both with the Apollo Modem (when the Tube host code surfaced) and then slightly later on the Demon II Modem) with the annoying "novector command" bug removed. Nowadays the Dataphone ZROMM is the ideal companion piece of software for all hackers, unless your requirements are no more than just for accessing the odd Bulletin Board, or Prestel, or even Microlink, then the ZROMM will be adequate as support software using the Disc Connect package supplied as an extra option for just £9.95.

If, on the other hand, you require more detailed access to the Modem, then you will most certainly need a more comprehensive package. You can either write one yourself

(which is very easy thanks to the excellent documentation that comes with the Modem) and BASIC programs abound on the public domain that use this software, or, you could use a package like the BBC's Modem Master as an easy front end for communications, leaving the ZROMM to control the mundane things such as the setting up of baud rates and protocols.

For computer to computer communications over a long length of RS232 cable, I would recommend that you use something other than the ZROMM, as it is primarily designed to communicate with the Designer Modem – nevertheless, the Dataphone ZROMM is an excellent package and worthy of being bundled with the Designer.

On the Move...

The Designer Modem need not be confined to just a BBC B though, I have used the Modem with the Archimedes 310 series running along a modified RS432 cable. Many of the transfer packages running on the Archimedes will work with the Designer Modem, although you will have to alter the wiring of the cable, as computer to Modem links require RTS to RTS, CTS to CTS Tx/D to Tx/D and Rx/D to Rx/D. Computer to computer comms requires these to be swapped over, eg, RTS to CTS (and vice versa) and Tx/D to Rx/D (and vice versa) with GND remaining unchanged.

Using a specially wired cable, this was the first Modem I have linked up to the Archimedes, and I was impressed by the results, although I haven't come across any automatic dial up software as yet, although I hear of some good things coming out from Magenta Research, I will be exploring the possibility of using their package with the Designer Modem in the near future.

The documentation is excellent; a 55 page spiral bound booklet containing tells you everything you need to know about comms before you log on for the first time – it also doubles as a technical manual with a breakdown of the hardware and the software – clearly Dataphone want people to write applications using their Modem.

More important is the list of telephone numbers at the back of the book so you can start to experiment with the Modem and have a look at what services there are available. Listed in this month's Fax pages are a whole list of BBS services, some of whom have some mighty fine Public Domain software and shareware accessible – the spirit of hacking still lives strong in these systems which are chock full of hints, tips, comments, as is a terrific community spirit – people who just occasionally ring up their local BBS service and download some software are downgraded, if you submit your own programs, add hints, tips, reviews and so on, then you start to become part of a tightly knit community of friends eager to share information.

Also included with the package is a voucher offering a £5 membership waiver to Microlink – this isn't a free membership

(although you could quite easily mistake it as being one) but a reduction in the cost of joining Microlink.

With the system recently upgraded to a Prime 9955 Mk 2 mainframe the service has been transformed into a fast access nationwide BBS system – although at times it resembles systems such as Prestel with frame charges. But Microlink offers an interesting and popular service for many Micro owners. Certainly Microlink is worth joining just for its access to PSS.

Conclusions

This is a very nice package that offers considerable features above that of the Demon II Modem. The Watford's Apollo Modem has 1200/1200 half duplex and uses similar software, but it requires manual setting of the Baud Rates to enable the correct communications speeds to be achieved – this is all automatic on the Designer Modem.

The Dataphone ZROMM is good software, although it is really just a support piece of software on this Modem. You will probably want to use another package with the ROM after a while, or, if you are a programmer, write a few of them for yourself – one such example is Clive Grace's *Hacker's ROM*, written some three years ago using the first version of the ZROMM, it still works like a treat even with the latest version of the Designer ROM. You can use any of the proprietary packages with the Designer Modem though, Modem Master and Communicator are just two examples of good packages.

The Disc Connect Package is a simple, no nonsense database of telephone numbers ready for you to use with any standard telephone system. Designed to work with the ZROMM, this is exactly the sort of software one needs if you don't know a thing about communications protocols and the like. You simply scroll up and down a screen of information at a time, press return to select the database or information service and you're away, the software will tell the modem what baud rates and protocols it needs followed by the telephone number and it automatically dials it for you – simple, but effective.

Add to this good construction, careful design and a decent price, I think you will agree that The Designer Modem is destined to be a classic.

The Designer Modem costs £119 plus VAT and includes a manual, all cables and the Dataphone ZROMM software in a 16K EPROM. The Disc Connect disc costs an additional £9.95 plus VAT and is available from Dataphone Ltd, 22 Alfric Square, Woodston, Peterborough, PE2 0JP. ☎ (0733) 230 240. ● Prestel Mailbox 733230240 – ● Telecom Gold Mbx. 72:MAG95608.

Mary Branscombe is a student at Oxford University currently "fooling around with Modems and generally reviving the Spirit of Hacking".

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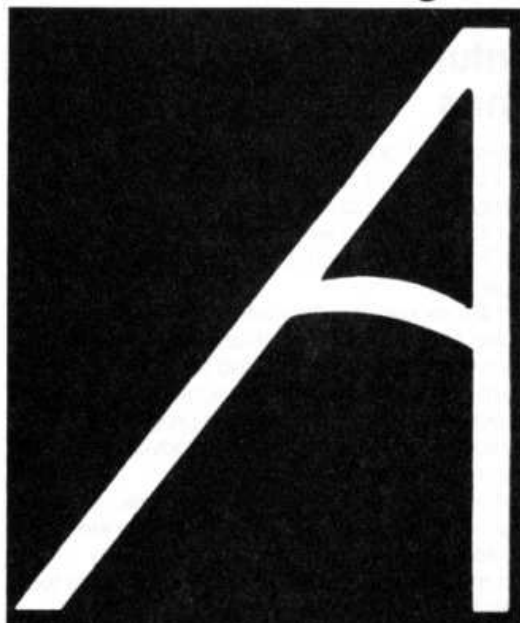
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ADVENTURING INTO EDUCATION

**You can *both* enjoy a good adventure *and* learn from it
says Des Thomas**

I started out by trying to put this pot pourri of educational adventures under subject headings, but this proved to be somewhat impractical, and I ended up with an age grouping which is, of course, only a very rough guide line.

The Early Years Pip Goes to the Moon

There are, understandably, very few adventure programs for those around reception age because of the language problem, so I was pleased to receive *Pip Goes to the Moon*, from Northern Micromedia. It's intended for children aged four to six, "preferably being operated by one child at a time" and designed to allow individuals to produce their own adventure books. That goes against one of my criteria for a start, because I usually recommend group use of the computer, as the discussion generated is often the most important aspect of the activity, so I would have liked at least a single or group use option available, which shouldn't have been too difficult I believe.

The program works from a main menu, which allows the user to: Have an adventure, Look at/print an adventure, Edit the file, and gives access to two hidden options: enter style of letters (curved or straight) and type of disc drive being used. Before beginning an adventure for the first time, option three must be selected to set up a Pipfile disc to save children's adventures for review/printout under option two.

Having begun the adventure, most of the choices are made by pressing the <Spacebar>, but they will need to recognise the numbers one to nine, add to five, spell their own name, recognise the initial letter of three words, and match shapes, colours and words. At the beginning the user has to select what to take to the moon, how to travel to the space station and the moon – options in picture form are highlighted and selected by pressing the <Spacebar>. Help with the count down and through/past comets, a planet or star are asked for. After landing on the moon, a coloured stone is chosen, resulting in an encounter with a Space Spook, Moon Mouse or Moon Masher, which throw up a variety of problems.

At the end, the teachers' option allows the story to be saved to the Pipfile disc, looked at or printed out. The latter option prints out the child's own adventure, which can be made up into his/her own booklet. The print styles are ideal and the whole package a simple and pleasing introduction to adventures for nursery/reception children. The package comes with a sample printout and a series of illustrations which can be used in games and other activities.

Albert's House

This is a program aimed at children in the four to seven age range, including those with learning difficulties. It

aids development of good hand/eye co-ordination, fine motor control and also gives practice in sequencing. The disc contains a suite of four programs designed to enrich topic work undertaken on the theme of "My House", which is a much used topic in this age range.

"Albert is a mouse who lives with a rather affluent middle class family and a cat." (Don't let that put you off!) "He's a very creative mouse and the computer is used to explore his house as a means of playing with him and eventually rescuing him." The program is divided into four parts, each at a more advanced level than the previous ones.

In part one the children explore the house – nine locations in all – using the arrow keys to place the screen cursor over the door handles or direction arrows. In my early version of the program this is far too picky for young children, but I understand that later versions are more tolerant and a Concept Keyboard version will be available soon. There is no writing on the screen at any time, so it's an easy way to explore the house, discuss what's there and compare with their own.

Program two allows them to search the house and text is used for the first time. The cursor is used for movement through the house and to pinpoint items requiring closer examination. On entering a room for the first time, pressing <H> reveals several flashing dots. These indicate objects or locations about which the computer stores more details. Moving the cursor to a dot will result in options being offered on screen, eg Look behind, Look inside. A wide range of objects are to be found and a variety of positional words used.

Hide and Squeak is the third option, in which the program hides Albert for the children to find, or allows them to hide him for someone else to find. A "mousemeter" in the form of a line on the screen or numbers up to 100 are available as a "hot/cold" guide.

In Save the Mouse, the children have to move around the house and save Albert from his dilemma. In order to do this they have to find various essential objects. Much of the information will be readily available to those who have explored the house thoroughly in the earlier programs, but it will encourage them to search the screen thoroughly for objects and information. No doubt most children will hope for a little more than the screen version of the prize for successfully rescuing Albert!

The handbook includes useful suggestions for using the program and the A4 master sheets of words and pictures the children meet in Search the House (program 2). This is another very pleasing program from RESOURCE and the keyboard of Derek Allen with the usual delightful graphics, which has been very well-received by my reception class – an excellent stimulus for language development.



Pip Goes to the Moon

The Yellow Brick Road

Occasionally they come off and in *The Yellow Brick Road*, which has been around for some time, I think they do. The program is aimed at children of seven to nine. The handbook suggests that the children need to know a little of the story of Dorothy and her adventures with the Tin Woodman, the Scarecrow, and the Lion.



Yellow Brick Road

"The activities generated by the program are designed to develop language skills through aspects of problem solving, decision making, prediction and projection."

The program comes in three parts, any of them being available from the main menu. In part one the children are invited to help Dorothy and Toto collect the Scarecrow, the Tin Woodman and the Lion in order to begin the journey to the Wizard's Castle. At various locations on a map the characters or items required to effect their release can be found. They have problems to solve at some of the locations and can refer back to the map at any stage.

Having crossed the ditch, the characters set off on their journey along the Yellow Brick Road towards the Emerald City. At each stage the children have to complete an activity – breaking a code, colour mixing, making words from letter blends. After successfully completing the activity they are given letters which can be rearranged to form a password for part three.



Albert's House

The final part of the adventure requires the players to complete various tasks to help the characters reach their goal. To obtain help from the Wizard they must find and destroy the Wicked Witch of the West. They must follow all the roads of Oz and overcome a variety of hazards – number patterns, codes, sentence ordering, reflected letters.

The handbook is very helpful to busy teachers – and those who find adventures beyond them! – giving solutions to the problems. The support material includes a range of extension activities to support some of the problems that appear in the program all very nicely presented on coloured card, plus some photocopy masters of the main characters. Used as the handbook suggests as part of a topic based on the story of the Wizard of Oz, this package has a lot to offer.

The Princess and the Ring

Since the early days of using a computer in school, some of the programs that have given me great pleasure and provided a stimulating challenge to youngsters in my school (and yours truly!) have been the simulations from Cambridgeshire Software House. Having become leading specialists in this field, I wondered how they'd make the transition to adventures.

The Princess and the Ring is a branching adventure written specifically for the five to eight age range. The booklet suggests that it could be used with younger children who are competent readers – this might have been easier if the program had used larger text, but although older children may enjoy the story the interest level is aimed specifically at younger children so they may find the adventure frustrating.

In the story the Wizard steals the ring without which the Princess cannot marry. As he hurls the ring into the air he whispers a magic word to himself and it flies off and falls into a magic pool. The point of the adventure is to find the magic word that will get the ring back for the Princess to wear. The adventure starts at the gate to the wood and the user is given the choice of going through the gate or not – the first of the branches. There are ten picture screens – I found the tonal nature quite pleasing, but perhaps rather small and a little sophisticated for the age group (compare with the bolder approach of Sherston's graphics) – and more than twenty information screens to help solve the problem.



The Princess and the Ring

The Mysteries of Lamcote Manor

This piece of software comes from a software house that's new to me. The catalogue states that "Superficially, the program is of an adventure format" and therein lies my main criticism. The story theme is very superficial with little mystery about it and there's no theme among the problems to compensate. Having said that, most of the problems taken individually are well-presented, although there's little new, and do require considerably more than a touch on the Spacebar!



Lamcote Manor

The portcullis is used to present an introduction to wordsearching; there are three maze-type problems requiring different instructions; in the corridor keys have to be matched with locks; while the attic offers a simple co-ordinates grid. Lord Manver's living quarters gives a pleasing mapping problem and the youngsters will enjoy operating the lift, where the objective is to manipulate the letters (one on every floor) so that they spell a word. I must admit, I didn't think much of the ghost writer's certificate!

Nature Park Adventure

This is the first of two programs I've included in this article based on the theme of conservation and comes from Sherston Software, who are well-known in the adventure field with *Wizard's Revenge and Return*, *Space Station Mada*, *Fleet Street Phantom*, etc. *Nature Park Adventure* is in three parts and comes on two floppy discs. The fourth side holds the mathematical problems taken out of the context of the adventure which can be used to aid individuals who may have some difficulty with a particular concept.

Briefly, the theme of the adventure, which is

introduced in a full-colour story booklet, is based on the theft of some rare butterflies. These have been stolen from the Nature Park by some nasty creatures – the Trogg and two Glob monsters. The children are invited to find the butterflies so have to explore the Nature Park. In doing so, they meet many of the animals living there and are faced with a series of challenges. These involve identifying leaf shapes, animal tracks, butterflies and birds correctly and solving the mathematical puzzles mentioned earlier.

This program is supported by a series of cards – three nature cards of tree and animal silhouettes and animal footprints, five information cards on specific creatures and trees, two maths cards and three adventure cards with questions on the story and "What's going to happen next?" – and the usual helpful handbook with its topic flow chart and ideas for further development across the curriculum.

There is no SAVE option in the program, but as each part is intended to take around 30 minutes and can be loaded individually, this shouldn't be a serious problem. The screen display, some of the most pleasing to-date, which has become an important feature of Sherston's programs, consists of three windows – a large and effective graphics display (it would be useful if a dump facility were included so that some of the illustrations could be incorporated into children's writing), text and instructions. There are some amusing touches with the children shrinking in size, the meeting up with Fangs and his sister Tarant (spiders, what else) and two Hitchcock style beetles (Lou and Bill), some of which may not be obvious to the youngsters. They'll enjoy working with this one!

Upper Juniors

Adventures in English Series

This series of software from Holmes McDougall is different from the rest reviewed in this article in so far as the computer programs in most instances provide a relatively short introductory "adventure" leading into other language work provided in very comprehensive sets of Pressure-Fax Duplicating Masters.

Many were first published in 1985/6 so, bearing in mind the speed with which things move in the field of computer software, it's not surprising that several, eg *Spellbound*, *Pirate's Treasure*, *Spooky Towers*, are somewhat dated – poor Mode 7 graphics and the rather weak themes do little to hide the fact that they cover a number of fairly basic language skills, ie drill and practice.

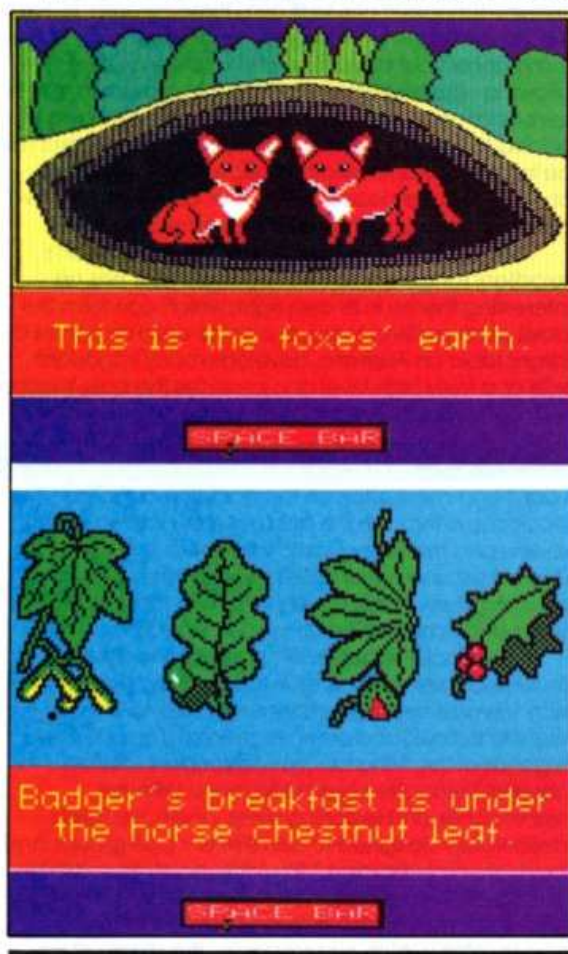
There are, however, two packs I'd be happy to use, because I can see them providing useful material to enhance and extend a topic and help develop some of the higher order skills. The first, *McGinty's Gold*, fits in neatly with any topic on newspapers or communications and therefore might link with Sherston's *Fleet Street Phantom/Typesetter* (reviewed in January's edition) and British Telecom's *Scoop*, which I'll come to later. The second is *Wrecker's Rock*, which links into a number of themes: the police, safety, the sea.

McGinty's Gold is a two part adventure in which the pupils take on the role of a junior reporter on a local newspaper – sounds just like *Fleet Street Phantom* so far, but no further! – whose first assignment is to report on the auction of the household effects of a notorious armed robber who has died recently in prison. In the first part of the adventure the reporter has to use the newspaper's database to discover background information – nice touch! At the auction our intrepid reporter bids for a writing desk, which gives up McGinty's notebook with directions on how to find the stolen gold bullion.

Following these instructions successfully in part two, which involves solving codes, using an on-screen gazetteer and crossing a marsh, results in finding the gold, the arrest of the only member of the gang free, a promotion and a reward. The sound level option – available in all the programs – is very useful, as is the teachers' option which enables the reporter to be saved from the marsh if necessary. Graphics are used in small doses so are not unpleasant.

Wreckers' Rock is an adventure using colour graphics and sound – the latter is quite effective – to simulate the detective work involved in finding out the plans of a gang of modern-day wreckers, and then thwarting them. It begins when a conversation is overheard about a plan to attack a lighthouse, smash the light and so wreck a ship. The story then proceeds by detective work on the part of the player or group. Research skills required include the reading of bus timetables – 12 and 24 hour clock, a telephone directory and a simple map; code-breaking using a key; and the sending and receiving of simple Morse Code signals.

Sheets 11-20 of the activity sheets introduce a new adventure called *Private Eye* in which the pupils become a private detective to track down a missing person. Again, this calls for a wide range of reference skills, with samples from the Yellow Pages, Street plans, telephone calls, using atlases and encyclopaedia, etc.



Nature Park Adventure

Whispy Wood

RESOURCE's *Whispy Wood* is the other program based on a conservation theme, but this one has more of a

traditional adventure flavour about it. All the problems the youngsters come across are associated with the environment and movement around is by means of one word commands, eg compass, directions, climb, dig, hide.



Whispy Wood

The program is in two parts, but in both the children are asked to assume the role of a caterpillar (regular readers might remember Ginn's *Suburban Fox* in which the user was asked to take on the role of a fox). Munchie the caterpillar has to find his way around the wood meeting the other creatures going about their everyday business of survival. In the first section the wood may be explored without coming to any harm simply by pressing N,S,E or W to indicate the desired direction of movement. This enables a map to be made of the wood and, depending on the option selected from the teachers' page, obtain descriptions of the locations with flora and fauna identified. Other options available give compass directions only (for rapid mapping); full description of location; no description but flora and fauna identified; and limit the size of the wood (30 – 54 locations).

If this work is to be done thoroughly, it's going to be quite time consuming – fortunately, there is a Jump facility <Shift> which allows the locations visited to be listed and enables the user to jump to a designated new location. The basic mapping can be achieved as a collaborative effort by the whole class, so again I would have found an option which permits a printout of the information useful to form the basis of a large wall map, which could be used by individuals /groups when the computer was being used by other groups in preparation for their Test of Fellowship.

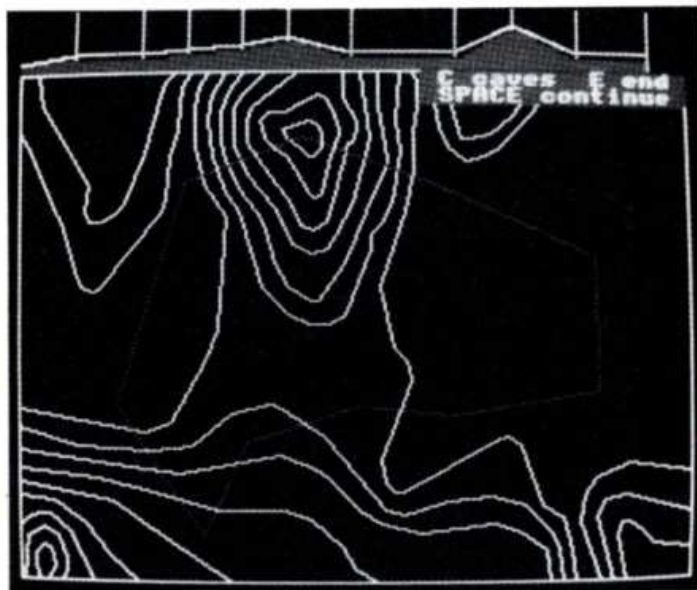
This is the second part of the program in which Munchie may be attacked by any of the dangers in the wood. "He must remember to think like a caterpillar and that he is only four centimetres long. There are five levels of the test: the higher the number the harder the test, so in level five he may be attacked by all the dangers, while in level one only some of the dangers will harm him."

A copy of *Woodland Life* in the Usborne Spotters' Guide series is included in the pack, which the children can refer to in order to find out more about the plants and animals mentioned. Look closely, and some delightful Derek Allen cameos can be found, but I would have liked to see some detailed drawings

occasionally in part one in place of the descriptions, ie sometimes find the plant from the description; sometimes from a drawing. This program will enhance any project on woodlands undertaken with upper juniors.

Junior/Secondary Bush Rescue

There will be many schools undertaking projects on Australia in 1988, their bi-centennial year, and *Bush Rescue* will provide an interesting addition to the resources available for such a project. It's a collaborative effort between 4Mation and Jacaranda Software and much use has been made of electronic mail during its development – I often wondered what people did with it besides passing rude messages! I've been using the Australian version for this review which, incidentally, costs in excess of 50 percent more than the UK version will. I found this fact quite interesting, especially as the presentation of the backup material in no way matches what I've come to expect from 4Mation – something they'll be improving upon before the UK version hits the market. The program is supplied on a floppy disc but, if you've access to a double disc drive, the handbook gives details about modifying it so that the two drives can be used, hence saving the need to swap discs.



Bush Rescue

In *Bush Rescue* a camping trip to a national park has to be planned. This involves using timetables – watch for the 12 and 24 hour clocks! – calendars and Infotel to book trains, buses and the camp site. Infotel is based on Prestel and the Australian Viatel systems and provides as simple an introduction to the system as any I've seen. Once the camp site is reached, you become involved in helping to find and rescue an injured caver, later help navigate the rescue helicopter that takes the caver to hospital and finally you can produce a report for the local newspaper.

Before setting out on the rescue mission you decide which of the three levels of difficulty you wish to use – the easier the level the slower time passes and the fewer problems involved. The adventure is based on the Aussie topographical map (equivalent of our O.S. map) of the Caves Bay area – one full-colour version of the 1:25000 map and a photocopy master of the

1:35000 map are included in the backup material. Using the cardinal points of the compass and assisted by the screen-based descriptions of the area, you find your way around the map. At various points on the trails you find members of the lost party who may have information and/or important items of equipment, eg you may find the right cave but, unless you have the correct equipment you can't enter. Irrespective of the level of difficulty, everyone has to build a bridge across the river – a neat logic exercise in using various lengths of logs and negotiate mazes in the tea maze and the cave.

Having found the injured person, you then have to return to the camp in order to navigate the helicopter rescue team to the cave. When planning this two things must be kept in mind: the helicopter must fly directly over the mouth of the correct cave and return to the camping grounds, and at no time should it be more than 80 metres above the ground. Up to ten legs are allowed, with markers being placed at the end of each leg (flag icon) and the ruler and compass icon gives access to a distance/direction finder, with the actual measurements being shown in the top right hand corner of the screen.

When the rescue has been completed, you are expected to write a report for the local newspaper, and the program provides a newspaper format which automatically prints the heading, date, price and a picture. The report has to fit onto three screens. Before this, however, the sub-menu gives access to a summary of your adventure on 20 screens before allowing you to write your report or opt to return to the keyboard at a later time. An additional option is to be added to the UK version which enables this program to be transferred onto another disc so, if you're lucky enough to have access to another computer, the two activities can be going on at the same time.

Bush Rescue is a pleasing addition to 4Mation's excellent range of adventure programs. It has an interesting theme in its own right, which can form the basis of an exciting topic, or can be used as part of a larger topic on Australia, develops many important skills at a fairly high level and provides the busy teacher with numerous practical ideas for the classroom.

The Arthur Project

I don't comment often on the packaging, but another pack came through the post as I was drafting out this review and the flimsy plastic wallet was split on arrival. By contrast, *The Arthur Project* is very attractively and sensibly presented in a red A4 file with the worksheets, slides and cassettes neatly packed inside.

In this pack the publishers have "assembled a multimedia set of resources which should go a long way towards helping teachers (of children from ages eight to thirteen and older) to present the myths and legends of the Arthurian Era in a proper historical context. The materials provide many different approaches and teaching styles, and have been deliberately designed to suit different age groups and levels of understanding." This latter point I found to be very much in evidence, which made it both a strength and weakness, eg the style and content of the commentary which accompanies the slides will be well above many of the children who will be able to manage the adventure quite comfortably.

The adventure provides a dramatic version of one of Arthur's legends, The Quest for the Holy Grail. "The adventurer is Arthur, and the more the user thinks like "the King", the greater are the chances of success. There are several possible paths from Camelot to the Shrine of the Goddess wherein lies the Holy Grail, and

what happens is partly determined by the choice of companion.

The program has a sound level option which rather pleased me, as I found the fanfare for success or alternatively return to Camelot rather irritating after a few times, while there were occasions when some suitable sound effects could have been used to advantage. Likewise, the graphics were reasonable without being terribly exciting – I quite liked the almost Lowry-like knights and horses – but the designer took rather a lot of artistic licence with Stonehenge!

If you intend using the project sheets with the whole class, you'll probably need to buy a few more copies. I haven't done a reading level test on them, but I think it would be fairly high and they are rather packed with information for the younger/slower children, so you may be better off using the ideas to produce your own sheets rather than buying more. As I intimated earlier the tape/slide sequence is probably more suitable for the oldest/brightest children, while the stories on the other cassette might have been improved with several voices, but of course the youngsters can produce dramatised versions for themselves.

Despite the fact that I've not been overenthusiastic about some elements, the principle of the multimedia pack is an excellent one. Producing one suitable for 8 to 13 year olds is quite a tall order. The results suggest that it's well worth hoping they'll come up with others.

Scoop

This program has been developed by the Computers in the Curriculum Project at Kings College in collaboration with British Telecom Educational Service and designed for use with 11 to 16 year olds. It's a very well-produced package and is obviously heavily

subsidised by BT. The handbook suggests it's possible to use the program with top juniors. It'll be a challenge to a group of bright sparks and, if used alongside *McGinty's Gold and Fleet Street Phantom*, will provide a useful range of material for any communication topic.

The adventure is based on one day in the life of a journalist and his attempts to obtain an interview with a multimillionaire recluse, ie obtain a SCOOP! The pupils, who take on the role of the journalist, spend the day travelling to different locations in pursuit of the millionaire. If all the information technology devices, eg databases, Prestel, fax machines, radio pagers, answerphones, and the not so technical, eg talking to people, reading press cuttings, are used to advantage, then it's likely that they'll obtain their exclusive interview. Having achieved this, they have to write up their Scoop for the newspaper using the information gleaned from working through the program plus the press cuttings file.

The handbook suggests that each group will need at least two 40 minute lessons to finish the program, yet no SAVE facility is provided – they're expected to make notes so that they can return quickly to the point! I suppose that's one way of ensuring careful notetaking, but it's rather wasteful of computer time!

The press cuttings file is very well-presented, as are the information booklets on IT devices used in the program. The latter also offer assignments that reinforce the knowledge and are centred on locations in the program, eg viewdata systems at the airport, telex, databases, radio pagers, electronic mail in the electronic office, phones in the hotel, while the Benton's Arcade booklet concentrates on "the general effects of issues raised by information technology".

That'll do nicely, BT. Aren't there any more generous benefactors out there?

Forthcoming Attractions

There are a number of adventures due for publication during the first few months of 1988. I've been playing around with a pre-release version of 4Mation's newest program, *World Without Words*, which had all the tongues wagging at the BETT exhibition. It's a very clever program, which will be well worth looking out for – full review as soon as all the documentation's available. Then there's *The Wizard Strikes Back*, a sequel to *The Princess & the Ring*, from CSH, *The Worst Witch* and *The Teacher's Cupboard* from Sherston Software, *Fairylands* and *Farmlands*, adventures linked with those two delightful desk-top publishing packs, *Fairy Tales* and *Old MacDonald's Farm*, from RESOURCE, and *Funfair* and *Pip's Island Adventure*, a sequel to *Pip Goes to the Moon* from Northern Micromedia. For those with an Archimedes there's a new version of *Droom*. Plenty to keep the adventure enthusiasts happy!!

Factfile

Pip Goes to the Moon £9.00 (Model B/Master), £11.00 (Compact) *Yellow Brick Road* £12.00 (Model B/Master) £14.00 (Compact) *Funfair* £14.00 (Model B/Master) £16.00 (Compact) *Pip's Island Adventure* – price not available yet

Northern Micromedia, c/o NORICC, Resources Centre, Coach Lane Campus, Newcastle-Upon-Tyne, NE7 7XA (091270 0424)

Albert's House £16.95 (Model B/Master), £18.95 (Compact) *Whispery Wood* £14.95 (Model B/Master & Compact) *Fairy Lands* £14.95 (Model B/Master) *Farm Lands* £14.95 (Model B/Master) *Droom* £14.95 (Model B/Master) £18.95 (Compact & Archimedes)

RESOURCE, Exeter Road, off Coventry Grove, Doncaster, DN2 4PY (0302 63800)

Nature Park Adventure £17.50 (Model B/Master) *The Teacher's Cupboard* £16.00 (Model B/Master) *The Worst Witch* £15.00 (Model B/Master)

Sherston Software, Swan Barton, Sherston, Malmesbury, Wilts SN16 0LH (0666 840433)

Adventures in English Series: *Pirate's*

Treasure, *Spooky Towers*, *Spellbound*, *Goblin Winter*, *Wrecker's Rock*, *McGinty's Gold* £22.95 each (Model B/Master)

Holmes McDougall, Allander House, 137-141, Leith Walk, Edinburgh

The Princess and the Ring £23.00 (Model B/Master), £27.50 (Compact) *The Wizard Strikes Back* £23.00 (Model B/Master), £27.50 (Compact)

Cambridgeshire Software House, The Town Hall, St Ives, Huntingdon, Cambs, PE17 4AL (0480 66805)

Bush Rescue £21.00 (Model B/Master/Compact) *Worlds Without Words* £25.00 (est.) (Model B/Master/Compact)

4Mation Educational Resources, Linden Lea, Rock Park, Barnstaple, Devon EX32 9AQ (0271 45566)

Arthur £29.95 (Model B/Master), £31.95 (Compact)

Nene Valley Publishing, PO Box 49, Spalding, Lincs, PE11 1NZ (0775 69518)

Lamcote Manor £10.00 (Model B/Master)

Somasoft Educational Software, 1, Lees Barn Road, Radcliffe-on-Trent, Notts, NG12 2DT (06073 4120)

Scoop £12.50 (Model B/Master) British Telecom Educational Service, PO Box 10, Wetherby, W.Yorks LS23 7EL (All prices exclude VAT)

LET'S TALK!

Z88

Paul Fellows of Cambridge Computer writes about transferring BASIC files from Beeb to Z88

During the history of the BBC micro many things have changed. We have witnessed new disc formats, new keyboard layouts and even a new processor chip. But throughout all this, the common theme which has bound together the BBC micro family has been BBC BASIC.

BBC BASIC – Or is it?

All the machines from the original Model B through to the new Archimedes are equipped with a version of this language in ROM. Until recently this was only true of Acorn machines but now there is a new member of this exclusive club – the Z88 portable from Cambridge Computer.

However, all is not necessarily quite what it seems!

Problems, Problems

Very soon after obtaining a Z88 as a companion for my trusty Beeb I had explored the built-in wordprocessor, diary and other goodies and wanted to probe more deeply into the system. Using the utility program provided, I transmitted a short BASIC program across from the Beeb via the RS423 interface. All appeared to have gone smoothly until I tried to LOAD it. Each time I tried I was confronted by the message "Bad program".

My first reaction was to assume that the data had been corrupted during transmission. This theory was soon crushed when I found that transmitting the program back again produced a working program identical to the original. My next test was to try the reverse process. I typed a short program into the Z88 and sent it to the Beeb – with the same results.

Plan B

Undaunted, I studied the hex dumps of the program on the Z88 before transmission and of the non-working version on the Beeb after transmission. This showed that the format used by the two machines to store a program is different.

On both machines, each line of a program starts with three bytes which represent the line number and the length of the line. It is the order of these three bytes which is different. On the BBC micro the high byte of the line number is given first, followed by the low byte of the line number and finally the length of the line. On the Z88, however, the length is given first, then the low byte of the line number and finally the high byte of the line number.

	Beeb line headers	Z88 line headers
1st byte	hi byte of line no.	length of line
2nd byte	lo byte of line no.	lo byte of line no.
3rd byte	length of line	hi byte of line no.

The inconsistency extends to the way in which the start and end of the program are denoted. Programs on the Beeb always start off with a character 13 (&0D). This marker is not present on the Z88, its programs commence straight off with the start of the first line. At the end of a program the Beeb places a character 255 (&FF). This is distinguished from the start of another line since line numbers can only be in the range 1 – 32767 (&0001 – &7FFF). Hence, for a valid line number, the value of the first byte can only be &00 – &7F. The Z88 marks the end of the program using a dummy line header with a length byte of zero and line number of &FFFF.

	Beeb characters	Z88 characters
Start	&0D	–
End	&FF	&00
–	&FF	–
–	&FF	–

As an illustration look at *Example 1* which shows the bytes used to represent a two line program on the different systems.

Example 1
10PRINT"Hello"
20END

Hex values on Beeb Meaning Hex values on Z88

0D	prog start	
00	line header	0C
0A	line header	0A
0C	line header	00
F1	PRINT token	F1
22	"	22
48	H	48
65	e	65
6C	l	6C
6C	l	6C
6F	o	6F
22	"	22
0D	end of line	0D
00	line header	05
14	line header	14
05	line header	00
E0	END token	E0
0D	end of line	0D
FF	prog end	00
	prog end	FF
	prog end	FF

One solution to the problem of transmitting BASIC programs is to convert the program to a text file, send this text across and then to convert it back again to a BASIC program at the other end. The conversions can be performed using *SPOOL and *EXEC (or their Z88 equivalent processes) as follows:

From Beeb to Z88

1. Enter BASIC (*BASIC)
2. Load program (LOAD "test")
3. Start a spool file (*SPOOL testtext)
4. Spool the program (LIST)
5. Close the spool file (*SPOOL)
6. Transmit testtext
7. Enter PipeDream (P)
8. Load testtext as plain text (FL testtext No No Yes)
9. Delete the spurious *SPOOL at the end



10. Insert at the beginning: #B.J NEW
11. Save as plain text (FS testtext No No No Yes)
12. Enter the Filer (F)
13. Execute the text file (EX testtext)
14. Save the BASIC program (SAVE "test")

From Z88 to Beeb

1. Enter BASIC (B)
2. Load program into BASIC (LOAD "test")
3. Start the spool file (+S)
4. Spool the program (LIST)
5. Close the spool file (-S)
6. Transmit the spool file

7. Start a new BASIC program (NEW)
8. Input the text file (*EXEC testtext)
9. Save the BASIC program (SAVE "test")

The problem with this method is the speed (or rather lack of it) of *EXEC (and its Z88 equivalent). This command reads in the lines one at a time, and for each one it searches from the top of the program it has already built up until it finds the appropriate place to insert it. Since the line numbers are in increasing order, this means that it has to search down one more line each time so it takes an increasing length of time to insert each new line.

A better solution lies in *Listing 1*. This is a simple program which transforms a BASIC program in one particular format to the opposite one. Using this program on a BBC Micro, a Beeb program can be transformed to Z88 format, transmitted as a BASIC program in the normal way and then run immediately on the other machine. Alternatively, a Z88 program can be transmitted to the Beeb and then transformed before it is run there.

As a comparison of the times involved, converting the convertor program itself on the Beeb before sending it took 0.4 seconds, whereas converting the corresponding text file to BASIC on the Z88 took 56 seconds.

The speed with which programs can be transformed using this program means that I now do all my development and editing on the Beeb which has the benefit of a full size screen and an excellent editor (I have the BASIC Editor fitted) and simply transform and transmit the programs whenever I wish to test them on the Z88 with hardly any delay at all.

Used like this, the machines make a perfect couple.

Paul Fellows is Product Development Manager at Cambridge Computer Ltd and Author (amongst other things) of the Master Compact window operating system.

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ILLUSTRATOR

Affordable computer art at its best — from Nidd Valley

Introduction

With so many graphics packages for the Beeb, Nidd Valley have entered the arena with a disc based package called *The Illustrator*.

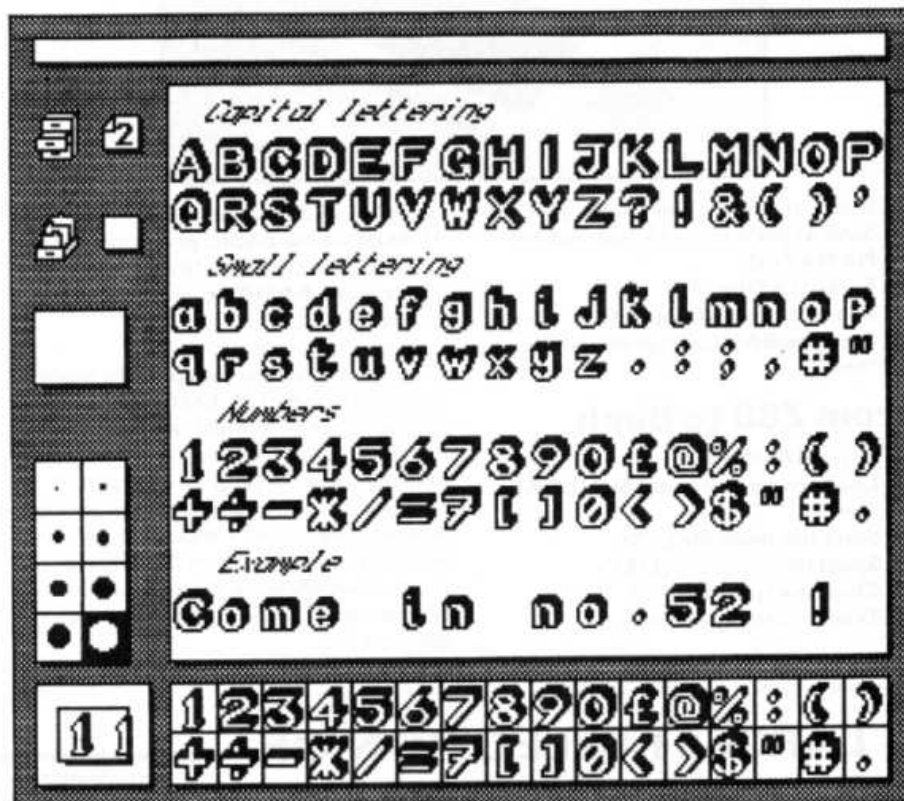
To run *The Illustrator*, you simply insert the disc in the drive and boot up — there are no ROMs to fit. In these days of highly populated ROM expansion boards, this is a welcome move — also, the price of the software is fairly low, you will have change from £20.

Bundled options

The *Illustrator* software is supplied by Nidd Valley Micro Products and costs £19.95, or £49.90 with a Nidd Valley Digimouse. The software is supplied on a 5" inch disc, it comes with a 12 page A5 instruction manual, and a function-key strip.

After booting the *Illustrator* disc, you are presented with the main screen. The display uses Mode 4, and defaults to a red on white display, although you can easily change these colours to suit your monitor if required. The all too familiar WIMP (Windows, Icon, Mouse, Pointer) environment is used, with a series of selection windows and icons around the work area.

At the bottom of the screen is the *pattern bank*, containing 32 patterns, with the



current one displayed in the pattern box to the left. Different patterns can be loaded or saved to disc, thus providing a means of having a virtually unlimited range of patterns. The pattern required is selected in the usual way, by moving the pointer over it, and then clicking a mouse button.

A selection of eight different paint brushes are available, with further ones on disc; the brushes available are shown to the left of the work area, with the current one displayed as inverse. As for the patterns, the desired one is selected and a mouse button pressed to lock it in.

Pop ups and wimps

A friendly menu system is called upon to perform all necessary load and save operations. After clicking on the filing cabinet icon, a pop-up appears (to select which function is required). You can choose to load or save the current picture, brushes, patterns, or icons.

For load operations, a display of files in the appropriate directory is shown — *Illustrator* stores different types of file in specific directories, ie screens are stored in directory "S", icons in directory "I", and so on.

For save operations a file display is shown; If the save will result in a file being

overwritten, you are warned of this, and prompted to confirm that the save should proceed.

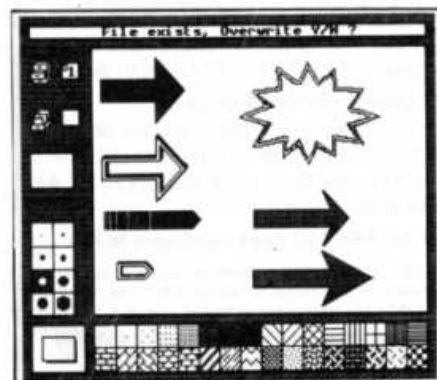
Pull down power

At the top of the screen are three pull-down menus. Actually there are two sets of these, with display toggled between them by clicking the pointer over the menu selection icon.

The functions menu selects various line and shape drawing actions. You can plot single lines, multi-lines rays and so on... All these operations are rubber-banded to facilitate correct placing of the lines. The exact style of the lines are chosen from another pull down menu — solid or dotted, in black, white, or inverted.

Selecting the "text" option enables text to be placed anywhere on the screen. Another pull-down menu selects the one of the six typefaces to be used.

Rectangle or triangles can be drawn using the appropriate option. Circles, ellipses, sectors, or curves can be produced by accessing the "curves" pull-down menu, with numerous polygons under the "regular" pull-down menu. When drawing these shapes, the function keys are used to alter their dimensions and rotation.



Editing points

A powerful pixel editor exists; when the pointer is over the area to be edited, it can be expanded to fill the screen for editing. The pointer can be moved over individual pixels.

Entering the Expansion menu produces another set of options to choose. These include flood fills, various cut and paste/move and copy facilities.

The "extensions" sub-menu allows you to select the mouse sensitivity, screen size, and access to a user-defined printer dump for non Epson-compatible printers. The screen size option allows you to select either a standard mode 4 display, or a compressed mode 4 display where the screen is half its normal width. The "icons" option allows you to design your own 16 by 16 pixel icons. A gridlock option places a restriction on graphic functions to help with the lifting and placing of icons.

A whole set of cut and paste facilities can be used to manipulate the current drawing. In normal use, pressing the <Copy> key results in a straight forward copy of a block to be performed. The cut and paste option performs the same job, except you can alter the size of the image when reproduced.

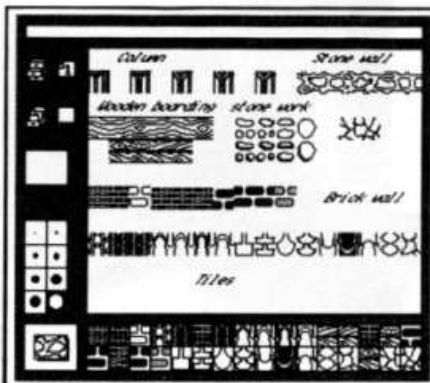
A "grab and cut" facility enables section of previously saved screens to be grabbed

and placed in the current picture. The "grab and copy" variation of the former allows the function keys to be used to select the proportional ratios used.

The Printer Dump

The "printer" option from the expansion menu allows you to produce a hardcopy of your artwork on an Epson-compatible printer.

After selecting the type of dump required, the screen displays a sheet of fanfold paper, with a box representing the size of the dump that will be produced. The position of the dump can then be moved around the "sheet"



using the mouse. When positioned, dump can begin. It was quite nice to see that the program didn't "hang" if the printer wasn't connected — instead a message "printer not connected" is displayed.

Non-Epson-compatible printers, are supported.

Digimouse or fat rat?

Unlike other mice, Nidd Valley's mouse has hardware incorporated to impose a linear lock. On the left-hand side there is a small slide-type switch to impose the lock. When engaged, pressing the left hand button causes only vertical movements to be sent to the computer. Similarly, pressing the right-hand button causes only horizontal movement to be sent. This is particularly useful when horizontal or vertical movements only are required.

For its price, The Illustrator is a good buy. I feel it cannot compete with some of the more established colour Art Packages, but it is an excellent introduction to the world of computer art. It is very easy to use, and should suit beginners and children alike.

Factfile

The Illustrator software is available from Nidd Valley Micro Products, Freepost, Wetherby, West Yorkshire LS23 7YP. ☎ (0937) 844661.

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FAST MODEMS

David Somers evaluates the latest in high speed modems

Power To The User

In this review, three of the latest high-speed intelligent modems are under the spotlight – Tandata Tm602; Pace Series 4; Miracle WS3000.

Miracle WS3000

The WS3000 modem from Miracle Technology is available in a number of different versions. The basic WS3000 V2123 (£339.25) supports V21 (300/300 full duplex), V23 (1200/75 and 75/1200 full-duplex), and 600 or 1200 half-duplex data signalling rates; the WS3000 V22 (£569.25) offers V22 (1200/1200 full duplex) in addition to the former; the top of the range WS3000 V22bis (£747.50) offers V22bis (2400/2400 full duplex) in addition to the former.

Getting Connected

All three modems come in the same plastic case measuring 40 by 180 by 245 millimeters. On the front panel are ten light emitting diodes (LEDs) which allow a quick check of the modem's status and operation. The rear panel reveals the reset switch, RS232C port, control port, telephone socket, telephone lead, and power cable which connects to an external in-line type power supply unit (PSU).

A spirally-bound 94 page hardware reference manual supplied with the modem details how to set it up and the command set used, which is a hybrid of the familiar Hayes set. A detachable quick reference card was supplied at the rear of the manual.

The modem offers pulse (loop disconnect) and tone (DTMF) dialing, auto-answer, speed buffering whereby you can communicate with the modem at a different baud rate to that with which it is communicating, call progress monitor, and a battery-backed 64-entry telephone name and number store.

In Control

The modem's features are controlled using



the familiar HAYES command set, although a few differences exist between the set used here and in the Hayes Smartmodem 1200. Just to let you know that everything is working correctly, the modem issues an audible tone everytime it receives the **AT** instruction. Full details of the command set are given in the instruction manual in a clear and concise manner.

As I mentioned, the rear panel contains a control port. This is configured to the same pinout arrangement as the printer port on the Beeb. When enabled, anything that appears on the computer screen when the modem is in command mode is sent to the printer. The port is not buffered, so data may be lost if you are sending data more quickly than can be printed.

Pace Series 4

The Series 4 modem from Pace Micro Technology has to be one of the oddest looking modems on the market – in my household it was generally referred to as "The Chess Slab", and in the A&B office as "the Plastic Pancake". It measures 50mm x 295mm x 225mm.

Available in three models. The Series 4 2123S (£280.00) offers V21 (300/300 full duplex) and V23 (1200/75 and 75/1200 full duplex) data signalling rates; the Series 4 1200S (£458.85) offers V22 (1200/1200 full duplex) in addition to the former; the Series 4 2400S (£573.85) offers V22bis (2400/2400 full duplex) in addition to the former.

Physically, the Series 4 modem is a large beige wedge-shaped case with a liquid character display (LCD), three tactile switches, ten LEDs, and a further bank of ten

light emitting diodes to indicate the strength of the carrier signal. The rear panel houses the reset switch, user port, RS232 port, telephone socket, telephone lead, and power socket to connect to the external (PSU).

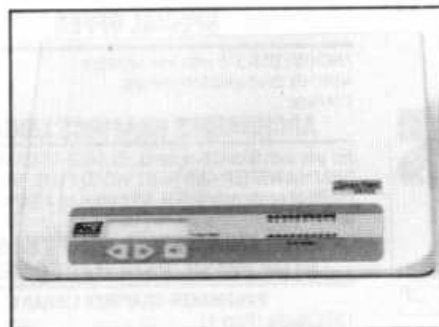
As is the norm, both pulse and tone dialling are possible, along with auto-dial, auto-answer, baud rate scanning, a battery-backed 64-entry telephone name and number store, and call progress monitoring.

Two instruction manuals are provided – an Installation Guide and a Reference Guide plus a laminated quick reference card which comes in very handy. The Installation Guide consists of 20 pages and describes the modem's switches, ports, and indicators, and how to hook it up to your computer.

Detailed information on how to control the modem is found in the 70 page Reference Guide. Full details with examples are given of the command set and the "S" registers.

Throughout use, the Series 4 modem has the look and feel of Pace's Linnet modem – (see A&B July 1987).

As mentioned above, the front panel has a LCD and three tactile switches. The "<" and ">" buttons are used to cycle through the



options displayed on the LCD, and the "SET" button to select or initiate the currently displayed option. Through this system, many of the modems facilities can be configured from the front-panel without having to worry about "S" registers. All you have to do, for example to change the contrast on the LCD, is to press ">" until the contrast option is displayed, press "SET", then "<" or ">" to decrease or increase the setting.

When in command mode, the LCD displays the current date and time. It would have been nice if the connect time would be displayed when the modem is online.

Tandata Tm602

Tandata's Tm602 modem (£573.85) is a triple speed affair offering V21 (300/300 full duplex), V22 (1200/1200 full duplex) and V23 (1200/75 and 75/1200 full duplex, 1200/1200 half duplex) data signalling rates.

Yet again, both tone and pulse dialling are possible with this modem, except that it looks at your telephone line and *automatically* works out if it can tone dial rather than pulse dial. The usual facilities of auto-dial, auto-answer, call progress monitoring are provided.

The modem is fairly big, measuring 50mm x 300mm x 170mm. On the front panel is a reset switch, and only five LEDs. On the back panel is the telephone socket, telephone vale, RS232 port, and power socket to connect to the external in-line type PSU.

The 26 page instruction manual provided details how to connect it together and the command set used. Although the manual was marked "Provisional Issue", the fact the copyright date was 1985, its fair comment to assume this is the final manual. When the modem is powered up the LEDs on the front panel light up in sequence as it goes through various self-tests. When finished and everything appears to be working OK, the online LED will flash at about 1Hz. This is described in the manual as the modems "heartbeat", and if not present, the modem is faulty – or

should that read "dead".

Unlike the WS3000 and Series 4 modems, the Tm602 does **not** use the Hayes command set; it uses the less-familiar V25 command set instead. With this system, the commands are fenced between STX (ASCII 02, control-B) and ETX (ASCII 03, control-C). So to dial Prestel on 618, for example, the command sent to the modem would take the form of: **control-B CRN618 control-C**. It is also possible to include a log-on sequence in the dialling command, but it is fairly tricky to program.

Closing Comments

Throughout their use all three modems behaved impeccably. Although fairly expensive, once you have used V22 and V22bis to log onto a distant mainframe or bulletin board, you're hooked for life and wonder how you managed at 300/300 or 1200/75 for so long. Accessing Prestel at 2400/2400 makes the system almost worth while, with the animated frames looking particularly attractive.

Of all three, I particularly likes the Series 4, in fact so much, I even bought the review machine supplied for this article! Its the little things such as being able to adjust the volume of the internal loudspeaker that impress. However, the shape does of it does tend to be a pain as you can't stack it.

Although the Tm602 is an excellent modem, it is difficult to use with the Beeb as many comms programs (eg BBC Soft's *Modem Master*) do not cater for it. However, PMS Communications confirmed that the BBC version of their DIALUP software does cater for this modem. (See A&B May 1987). All the instruction manuals were well written, although none had an index. Tut, tut! At the moment more and more online services are moving over to high-speed access ports. British Telecom's VASSCOM network will, eventually, allow you to access a host of services such as Prestel, Telecom Gold, etc., at these high speeds. There are even a few Bulletin Boards working V22 or V22bis.

Factfile

● **Miracle Technology Limited**, St Peters Street, Ipswich IP1 1XB. Telephone 0473-216141, Telecom Gold mailbox 79:KEY001 or 72:DTB10135, Prestel mailbox 919992265, Telex 946240 CWEASY G attn. 19002985.

● **Pace Micro Technology Limited**, Allerton Road, Bradford, West Yorkshire BD15 7AG. Telephone 0274-488211, Telecom Gold mailbox 79:PCE001, Prestel mailbox 274729306, Telex 51338 PACE G.

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ABACUS

Artificial Intelligence. Who will be the first to crack AI? Abacus dons his thinking cap and decides to throw his hat into the ring

For decades *Artificial Intelligence* has been the Marie Celeste of computer programming. Many have gone aboard in search of the Holy Grail of AI but found no intelligent life there.

Even the champion of AI admit that it is a quest bedevilled by the computers basic inability to grasp the conceptual difference between a gravy boat and an aircraft carrier.

Left to their own devices computers would be quite happy chewing the silicon cud, processing information, mindlessly numbercrunching ad infinitum. But there is a grim determination to put an advisor in the algorithms, a professional in the processors, and an expert in the eeprom to imbue the computer with the power of human judgement and decision making.

There have been many false dawns but can we now identify AI's ETA? The short answer is no. Abacus can now reveal that AI research has been on the wrong track all along. The next major breakthrough is already with us... Artificial Inanity.

Having been obscured by the study of Artificial Intelligence, the 'other AI' is now set to take the computing world by storm. But how did it begin?

In the mid-sixties several rebel computer scientists jumped ship from mainstream thought on AI and embarked on a remarkable series of experiments. Among them was the reclusive and enigmatic figure of Professor Ernst Volt, whose motto "Wherever you want to go always start off in the opposite direction." became synonymous with alternative approaches to computer science.

The experiments, held in a derelict bus garage in San Francisco with a borrowed battered main frame were described in Volt's cult classic book, 'The Frenetic Computer Asinine Tests.' "We were getting to No-

whersville fast with an orthodox approach," wrote Volt, "How could insignificant we create a semblance of the cosmic complexity of man's most insignificant action within the circuits of a machine? So we began our think tank. We were young and naive. It was only after two days that we realised we didn't all have to be in the tank at the same time. Later we took turns."

"It seems we had given ourself an insoluble problem. Then Dr Beckerman suggested that we had two choices; the only way we could make computers with human-like intelligence was either to spend several hundred man years developing a machine or else make people a lot less intelligent so the machines could catch up. I was inclined to think that Dr Beckerman had been in the tank too long, especially as he had begun to pull his vest up over his head when anyone disagreed with him. Even so there was a seed, a germ, a small nodule of an idea in what he said. That night as we all slept standing up in the tank, I had a bolt of inspiration from out of the blue. Our problem was that we wanted the computer to be an instant genius, we never allowed it to make the mistakes that we always pass off as being "only human". This was the true birth of Artificial Inanity."

"The next morning I was so excited. I told Beckerman and he pulled his vest up over his head. I made the announcement, 'The time for thinking is over. Let's drain the water out of the tank and get on with the practical experiments'."

The weeks that followed were spent in day and night tests attempting to program Artificial Inanity into the computer. Volt's account states that the experiments were a complete success but Dr Beckerman in his biography, "I Talk To The Tree Diagrams," told a different story. "Things were not

going well, my brilliant ideas were being sniggered at. But there was one triumph. The eyeholes I had cut in the bottom of my vest meant that I was no longer colliding with things in the corridor."

After the publication of *The Frenetic Computer Asinine Tests*, Ernst Volt disappeared without trace and it was believed the idea of Artificial Inanity had disappeared with him but it can be exclusively revealed that he is alive and well.

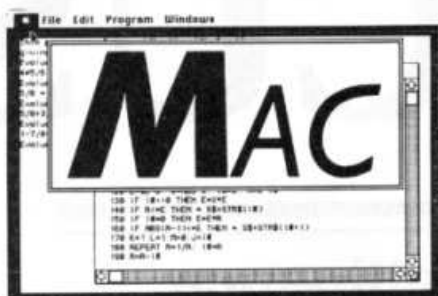
Twenty years on, Professor Volt is a changed man, gone is the theoretical idealism of youth, gone are the bell bottomed trousers, Afghan waistcoat and shoulder-length hair. Today Professor Volt is an anonymous figure in a suit and head of a shady multi-million pound organisation called Inanity International. For years now Volt's teams have been secretly "humanising" any embryonic expert systems that have appeared.

Alberto Catamaran, the foremost authority on ancient Latin American cultures spent years transcribing all his knowledge onto a computer. The results were to be the definitive work on the subject. Catamaran made the mistake of calling in Volt as an advisor. Consider the finished version.

Question to computer; "What was the civilisation called that ruled ancient Peru?" Computer; "I hoped you weren't going to ask that one. Now let me see... was it the Incas or the Aztecs? I always get those two confused, don't you? Or was it the Mayas...? Next question please."

We may not see true Artificial Intelligence in our lifetime but thanks to Volt's contribution to computer knowledge the technology for the "other AI" is ready to roll. Its potential is limitless and I should know because I asked my computer.

LET'S TALK!



BBC files to Macintosh... It can be done!

This must be a first for A&B Computing – a review of software written for the Apple Macintosh! There is a BBC connection, of course. The two packages from Human Computer Interface Ltd provide both a BBC BASIC for the Mac with facility for direct transfer of programs to and from a BBC micro and a facility for general file transfer from Beeb to Mac with automatic reformatting of text files from *View* to *MacWrite*.

These programs are of particular interest to anyone using BBC and Macintosh computers in the same work environment which is quite common, for example, in the wealthier (ie further and higher) end of the education market. People with a Beeb at home but Macs at work will also find this of great use. Before describing the packages I will give a brief introduction to the Mac for the benefit of readers unfamiliar with the machine.



The Apple Macintosh

I had better not lavish praise on the Mac in case the editor has read this far (he has – Ed). However, I think I can safely say that it is a very interesting machine. Apple followed the Xerox team at Palo Alto and helped pioneer the now ubiquitous WIMP (Windows Icons Menus and Pointer) interface with the *Lisa* but enjoyed commercial success with the *Macintosh*. The window management system is in the ROM and all developers of Mac software are provided with a systems' language and toolbox with detailed guidelines. The result is unique in the micro world – an

interface which is standardised throughout all applications. Once you have used a few applications on the Mac you almost know how to use a new one without reading the instructions!

Although Macs have been around for a while, they have been evolving, and typical machines these days are the *Mac Plus* or *Mac SE* with at least one megabyte of RAM. Although the Mac is very big in education and other areas in the USA, it has a relatively small base in the UK which is reflected in the price of the hardware (a one megabyte MAC SE sells for around £2000) and software prices out of all proportion to those for the Beeb and Arc. I recently saw a top ten software list for the Mac in which the average price of the programs was over £300 each!

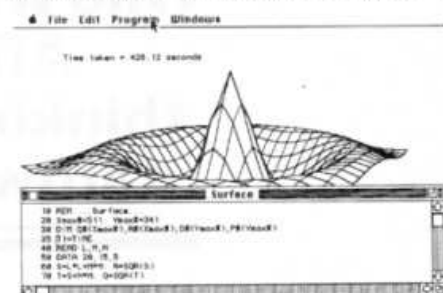
I will look first at the Mac implementation of BBC BASIC and then at the file transfer facility provided both in this package and the separately available *View* >> Mac program.

Mac BBC BASIC

One of the most obvious differences between the BBC and the Macintosh is the screen display. Standard Macs have a built in 9 inch screen with high resolution monochrome display (black on white). A larger screen and optional colour card is available on the more powerful and much more expensive Mac 2, but there are not too many of those around at present. The colour commands of BBC BASIC are provided in the Mac version but a standard machine will interpret colour 0 as white and all other colours as black. For the sake of compatibility Modes 0 to 7 are provided with enlarged fonts where necessary and automatic re-scaling of the BBC graphic co-ordinates to those of the Mac. Scaling problems result in a slightly reduced screen size, so a native Mac Mode 8 is provided in which the exact Mac screen co-ordinates can be accessed in all the **PLOT** commands. Most of the **VDU** and **PLOT** commands have been successfully emulated.

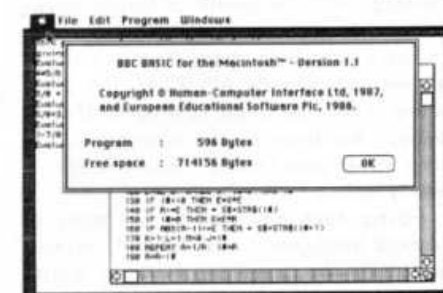
HCI have not attempted to simulate the

programming environment of the Beeb apart from getting *Escape* to behave in a similar manner. Apart from the usual pull down menus for filing operations, the language provides two main windows. One of these is the graphics window in which the programs' display is shown. You can also **LIST** your programs and edit them in this window if you wish though the BBC copy editing does not work (**LIST IF** and **LIST07** also work). Much better, however, is the text editor which is always present containing an ASCII version of the program in memory. This is a standard text window which will overlay the graphics screen when in use but which can be resized and moved or completely hidden under control of the trusty mouse. Figure 1



shows an example where the edit window partially obscures the graphical output of the program. Full screen text editing is provided in this window with automatic renumbering of lines as you insert changes or cut and paste to move sections around. I found this editor to be excellent and a clear improvement on the standard BBC programming environment.

The most impressive aspect of the Mac BBC BASIC is the amount of memory which is made available to the user's program. I was using a Mac SE with one megabyte of RAM, some of which is required by the operating system, the language itself and the windows it uses. Even so, as Figure 2 shows, a staggering



700K was available. You cannot write a program anywhere near this big, if only because of the limited capacity of the edit window, but the real gain is in space for data. For example, very large databases could be read into string arrays and manipulated all in memory before resaving to disc or huge data sets could be crunched by a statistical analysis package. The disappointment, however, is that the running speed is significantly slower than on the BBC micro, in spite of the extra power of the Mac. This reflects the fact that it is written on the Mac in a compiled language and optimised in its design for byte

operations which are suited to an 8 bit machine – and of course the brilliance of Acorns implementation. I found programs to take up to 80% longer to run on the Mac, especially when real number processing and/or graphics was involved.

Language compatibility

The Mac is not supplied with its own dialect of BASIC or any other programming language. Hence, one purpose of the HCI BBC BASIC is to provide Mac owners with a general purpose language whose pedigree is established and which many owners will have learned through ownership or school use of the BBC machine. The second purpose is to allow upgraders to transfer software from the BBC to run it on the Mac. This is particularly important in the educational context where much commercial software is available in unprotected BASIC or for users who have developed large amounts of customised software. Hence, the compatibility of the Mac version of the language is an important consideration.

HCI BBC BASIC contains a full implementation of BASIC 4 as provided on the Master series, with certain omissions which I will discuss below. All the extended graphics routines are provided, including ECF patterns. The latter is especially important on the black and white Mac as it allows grey shade patterns to be substituted for colours in graphics plotting. A number of the structures in BBC BASIC 5 – the Archimedes version – are also provided including **WHILE..ENDWHILE**, **CASE**, **IF..THEN..ELSE** blocks, **TRACE**, **SWAP** and graphics commands such as **CIRCLE** and **RECTANGLE**.

Owing to differences between the operating systems and hardware of the two machines, however, a number of facilities have been omitted. There is, of course, no inline assembler and the * commands are not understood on the Mac. If your programs are littered with lines such as ***TV255,1** and ***FX1,1** then these will have to be omitted. This can, however, be done after transfer to the Mac and is facilitated by the **LIST IF** command. Mode 7 is not emulated, so that any **PRINT CHR\$** statements are interpreted literally (as on the Electron) and produce funny looking symbols from mysteriously undocumented depths of the Macintosh fonts. In this mode, as in all others, all colour numbers except 0 are printed as black on the screen.

I feel that HCI have made their BBC BASIC as compatible as possible, although the differences identified mean that the chances of any program being transferred and running without any modification are remote. However, my experience suggests that any experienced programmer should be able to adapt a transferred program very quickly and easily. A word of warning though – don't run a program which is autorun on

pressing Escape (**ON ERROR RUN**) since the Mac has no equivalent of the Break key. This happened to me and I had to quit the language from the File menu and reboot it in order to stop the program!

File transfer

To transfer files directly between Beeb and Mac you need a lead which connects the serial ports of the two machines. The Mac end requires a different sort of connector to the BBC version and if you have trouble getting a lead made up, the bad news is that HCI will charge you an outrageous £25 plus VAT to supply one. The good news is that the software supplied makes transfer simplicity itself.

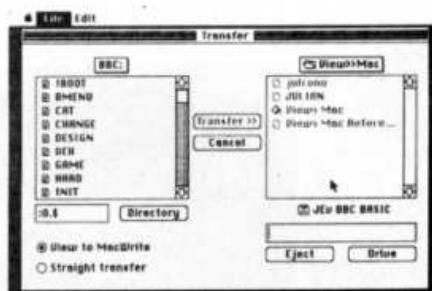
If you have only the BBC BASIC package then you will be able to transfer only BASIC programs as opposed to text or data files. If you are reading from the BBC then you must first load the program to be sent into memory and then choose RS232 from the Mac file menu. You will be prompted to type ***FX2,1** on the BBC (Figure 3) after which



you click OK with the mouse. Then the Mac takes over and sends instructions to the Beeb to make the transfer for you. The received program is stored as a file and does not affect the program in the Macs memory. Sending a program to the BBC involves a similarly simple procedure but the program ends up in the memory of the BBC so you must do a **NEW** first.

The snag here is that many useful BBC programs (such as an Adventure game!) require substantial data files to be transferred as well as LOADable BASIC programs. The Mac BASIC uses compatible data file formats but you won't be able to transfer them unless you also buy the **View>>Mac** package. As the name suggests this is primarily intended for transferring View files which are automatically reformatted into the most popular word processor on the Macintosh – MacWrite. Hence, ruler settings, stored commands for centered headings etc are correctly converted to their MacWrite equivalent. However, the **View>>Mac** program also provides a straight file transfer routine that can be used for transferring anything, including a data file required by a BASIC program. This program is also very easy to use and even provides a display of the BBC catalogue (current DFS or ADFS directory) as well as that of the Mac as shown in Figure 4.

As an *InterWord* user, I naturally investi-



gated the possibility of transferring text that was not created by *View*. A *Wordwise Plus* file is pure ASCII if all green codes are omitted so you should be all right, but *InterWord* uses funny control codes at the start of lines as well as all the header junk. Hence *IW* users should spool their files before transfer. What about all those hard carriage returns at the ends of lines, I hear you groan? Ah, well the writers of *MacWrite* have thought of that. When you load a text file into *MacWrite* which it did not create, it has to convert it. It first prompts you to indicate whether carriage returns indicate ends of lines or ends of paragraphs. If you signal the former then the surplus returns are stripped out automatically. Your paragraphs will survive as long as you separated those with a double carriage return before spooling.

Conclusions

At £149, *Mac BBC BASIC* will seem very expensive to BBC owners, but this is actually cheap for a programming language on the Macintosh, which are typically £300 or more. The version I received had some bugs in it which caused an occasional crash, but was otherwise quite satisfactory. I give it good marks for the programming environment and the compatibility with the BBC versions, but poor marks for the slow execution rate of the code. Direct transfer of files is easy but expensive with the £25 lead and the £49 *View>>Mac* package needed in addition if you have to transfer data files. Most users will, however, have need to transfer text files also, I suspect.

I have expressed the view that BBC BASIC is the best language for programming on the BBC because the small memory renders implementations of most alternatives unsatisfactory. However, I must say that it is not the best language to use on a machine of the power of the Macintosh. The flexibility of some of these languages leave BBC BASIC standing, and if you are considering programming the Mac I would really recommend that you expand your horizons rather than sticking to the familiar.

Factfile

● *BBC BASIC* and *View>>Mac* for the Apple Macintosh are available from Human Computer Interface Ltd, 11 Brunswick Walk, Cambridge CB5 8DH. ☎ 0223 314934

IBM is a trademark for International Business Machines Ltd.



LET'S TALK!

IBM

**David Somers
checks out
BBC BASIC
running on
the PC**

Figure one: The Benchmark program used in this review was from the PCW list of benchmarks.

As languages go, BASIC has been very popular among the hobbyists, especially BBC BASIC. However, you can now obtain versions of BBC BASIC for the more serious "business" machine such as the PC.

PC BBC BASIC(86) from M-Tec Computer Services (UK) is such a version, and runs on PCs with MS-DOS. The software comes on a 5" inch disc and is accompanied, as usual with software for the PC, by an inch thick A5-sized comb-bound instruction manual. Throughout this review, PC BBC BASIC(86) will be referred to as BASIC86, and BBC BASIC as Beeb BASIC.

After making a backup of the distribution disc, or copying the software into a suitable sub-directory on your winchester, BASIC86 is started by executing the BBCBASIC.EXE file in the usual manner. After various messages are displayed the familiar chevron (">") prompt appears and you're ready to start programming.

More than BASIC

BASIC86 is more than just the BASIC language as it emulates the Beeb's Operating System too. It even has a line editor and mini-BASIC Editor as well. BASIC86 requires 30 Kbytes of code space, 2 Kbytes of data space, and 64 bytes for the data segment giving PAGE a value of &600 and HIMEM &10000.

Getting Transferred

Programs written in Beeb BASIC will work in BASIC86, and vice versa. However, BASIC86 uses a different method of tokenising programs, so a conversion program is

```

10 REM >D-BENCH2
20 REM PCW Benchmark calcul
ator
30 @%=&90A
31FOR LOOP=1 TO 5
50 REM IntMath
60 PRINT "IntMath benchmark
..."
70 TIME=0
80 X%=0
90 Y%=9
100 FOR IX=1 TO 1000
110 X%=X%+(Y%*Y%-Y%)/Y%
120 NEXT IX
130 IntMath=TIME/100
150 REM RealMath
160 PRINT "RealMath benchmar
k..."
170 TIME=0
180 X=0.0
190 Y=9.9
200 FOR IX=1 TO 1000
210 X=X+(Y*Y-Y)/Y
220 NEXT IX
230 RealMath=TIME/100
250 REM TrigLog
260 PRINT "TrigLog benchmark
..."
270 X=0.0
280 Y=9.9
290 FOR IX=1 TO 1000
300 X=X+SIN(ATN(COS(LOG(Y))))
310 NEXT IX
320 TrigLog=TIME/100
340 REM TextScrn
350 PRINT "TextScrn benchmar
k..."
360 TIME=0
370 FOR IX=1 TO 1000
380 PRINT "1234567890qwertyu
iop",IX
390 NEXT IX
400 TextScrn=TIME/100
420 REM StoreFD
430 PRINT "StoreFD benchmark
..."
440 TIME=0
450 AX=OPENOUT("D-TEST")
460 FOR IX=1 TO 1000
470 PRINT EA%,"1234567890qwe
rtyuiop"
480NEXT IX
490 CLOSEEA%
500*DELETE D-TEST
510StoreFD=TIME/100
530 CLS
531VDU 2
532PROCresults
533VDU 3
534NEXT
535END
540 CLS
550 PROCresults
560 PRINT "Send results to
printer?"
570 REPEAT
580 A=INSTR("YyNn",GET#)
590 UNTIL A
600 IF A<3:VDU 2:PROCresults
:VDU 3
610 END
630 DEF PROCresults
640 @%=&20309
650 PRINT "
IntMath RealMath TrigLog T
extScrn StoreFD"
670 PRINT "Values are
",IntMath,RealMath,TrigLog,Tex
tScrn,StoreFD
680 multi=(6.2/IntMath)*(7/R
ealMath)*(52.5/TrigLog)*(89.8/
TextScrn)*(36.11/StoreFD)
720 VDU 3
730 ENDPROC

```


supplied. The easiest way to transfer programs, assuming you have you PC and Beeb next to each other, is to use the serial port. M-Tec can supply a suitable connecting cable and very simple software for £16.00 + £1.00 p&p + VAT. If you are transferring a large number of programs, it is easier to use *Kermit* and do a multiple file transfer operation. You can obtain *Kermit* free of charge from any good bulletin board.

In the beginning

Obviously BASIC86 can't emulate Beeb BASIC or its Operating System down to every small detail as the machines have different architectures. Most noticeable is the availability of screen modes provided by the VDU emulator. Mode 7, which is a 80 by 25 character monochrome text only display, is available if you have an IBM-compatible monochrome adapter fitted (which most do). Modes 0 to 6, which offer colour and graphics, are only available when an IBM-compatible Colour/Graphics adapter is fitted (which most haven't!).

In use, BASIC86 is almost identical in operation to BASIC IV, as found on the Master series of microcomputers. "*" commands allow access to MS-DOS' facilities, eg "*"cd "/" to return to the root directory. If you enter "*"CAT" or an abbreviation of it, the command is translated into the "*"DIR" format. The emulation really give the feeling

that you're using a Beeb, even down to pressing SHIFT and Ctrl simultaneously to stop the screen scrolling.

Screen handling has been considerably improved, with a super line editor. Instead of having to list a line and use the cursor control and copy keys to make any necessary alterations, the simple command EDIT <line> can be used. To cursor keys enable the cursor to be moved along the line, with INSERT to toggle between insert and over-type mode. Backspace and Delete erase the character to the left and right of the cursor respectively. Similarly, pressing Ctrl-U and Ctrl-Enter will clear the line to either the left or right of the cursor. These key combinations also work when using the INPUT function, making data entry much easier. Single key keyword entry, as found on the Acorn Electron, is also available. Pressing the ALT key in combination with one of the letter A to Z causes a corresponding keywork to be placed directly in the input buffer. Thus, ALT-L will cause "LIST" to be entered.

The BASIC Editor

A mini-basic editor can be called upon by entering *EDIT, and is similar to Acornsoft's BASIC Editor. You can insert and remove lines, but there are no facilities for renumbering lines. Nevertheless, it is still very good and a great boon to writing programs.

8086/8088 assembler

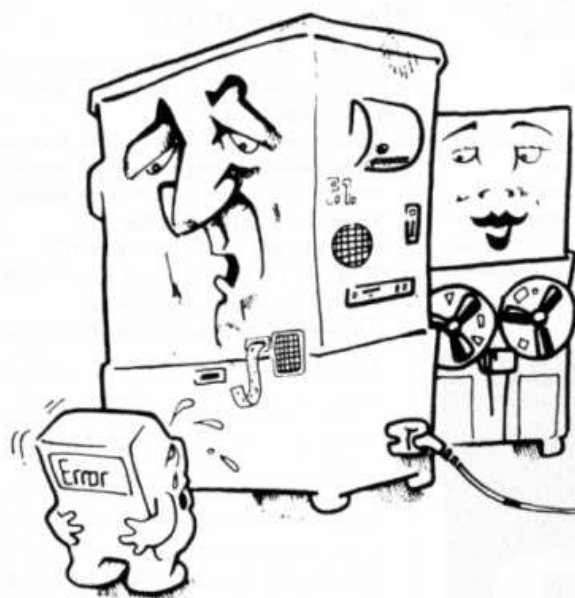
Just as found on the versions of BBC BASIC, BASIC86 has an in-built assembler, but for the 8086/8088 CPUs. The syntax conforms to the Intel assembly language syntax, although there are a number of minor differences which are described in some detail. A number of enhancements have been made, with the assembler now spotting multiple labels. You can, if you wish, include comments in the middle of lines, eg **MOV AX,X ;comment: POP BX; get address.**

BASIC86's author, Richard Russel, has done an excellent job. Indeed, he originally wrote the version of BASIC for the Acorn Z80 second-processor, and has recently written the version of BASIC as found on the Sinclair Z88.

From using the package it is obvious a lot of thought has been put into it. It will even allow you to use the SOUND and ENVELOPE command to play music, albeit through a bit-addressable loudspeaker.

Factfile

● PC BBC BASIC(86) costs £95.00 (+ £3.00 p&p) + VAT, and can be obtained from: M-Tec Computer Services, 4 Church Hill, Reepham, Norfolk NR10 4EL. ☎ 0603-870620, Fax 0603-870436.



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Competition Win a Designer Modem

You have read the review in this month's issue, and up for grabs is a fantastic Designer Modem package worth **£140** – just waiting to be won and plugged in to the telephone system.

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Comms Competition Comms Competition

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Just answer these simple questions below, fill in the tie breaker and cut out the coupon.

1. What is meant by **V.23**?
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4. What is also known as the **International Telephone Alphabet No.2**?
5. What is meant by the term **E mail**?
6. What is the fastest speed that the BBC Micro's **Serial** interface can go?

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● Neither the Judges nor ASP claim responsibility for entries lost, defaced, damaged, or otherwise lost in the post.
All entries are to reach us by **7th July 1988** – get to it!



ENHANCERS

Designed to make your computing life easier. This month there's a complete set of utilities for sideways ROM and RAM

This utility (Listing one) has six functions on its sub-menu. All of these relate to the use of sideways ROMs or RAM.

1. **Save** - This will save a sideways ROM onto disc with a suitable filename so that it can be reloaded into sideways RAM or EPROM on another machine. Simply type in the socket number of the ROM to save.
2. **Load** - If you have sideways RAM, this will load a ROM image previously saved into the RAM.
3. **ROM List** - This will list all sideways ROMs currently in the machine. If you have a ROM board, it will list those ROMs also.
4. **Dump** - This will dump (to screen or printer) the contents of any ROM socket in both ASCII characters and hexadecimal notation.
5. **Exit** - This will return to BASIC.

Call your BASIC programs instantly from sideways RAM or ROM

This routine (Listing two) will create a ROM image of your most frequently used BASIC program, so that it can be instantly available from EPROM or sideways RAM by typing a '*' command of your choice.

You will be asked for the filename of the BASIC program, the name of the program, the author, the '*' command and a suitable PAGE address (normally &1900 on a disc machine, &E00 on a Master).

Once the image has been created on disc, you can load it into sideways RAM using the load option from Listing one or your system's own * command eg *SRLOAD 8000 file X on the Master 128/Compact. It won't appear on a *HELP or *ROMs but it's there nevertheless and will instantly appear when its * command is issued.

Expert Utilities - ROM Toolkit.

```
(S)ave      (L)oad      (R)oms
(D)ump      (E)xit      (I)nfo

Which ?
```

Expert Utilities - ROM Toolkit.

List of Currently Present ROMs.
Current Rom: &C

0 Screenprint 0.2	8 ViewStore
1 Empty	9 DFS
2 Empty	A ViewSheet
3 Empty	B Edit
4 WORDWISE-PLUS	C BASIC
5 Empty	D Acorn ADFS
6 Empty	E VIEW
7 PRINTMASTER (Ep	F TERMINAL

Press Space To Return To Menu....

The programs in this article have been listed using the A&B Computing Checker. The four digit hexadecimal number in brackets at the end of each line is the "checksum" for that line. It is not to be typed in.

With Checker installed, each program line is assigned a unique checksum when RETURN is pressed to enter that line. Compare the checksum number on your screen with that in the magazine to be certain that a line has been correctly entered.

Checker is published periodically in A&B and featured on most Software Sale discs.

► ► ► ►

Expert Utilities - ROM Toolkit.

Rom Hex/ASCII Dump.

Dump which ROM (0-F) ? E

Send to printer (Y/N) ? N

Press <SHIFT> to scroll screen.

8000	4C	BD	80	4C	21	80	C2	0D	L..L!...
8008	04	56	49	45	57	00	28	43	.VIEW.(C
8010	29	20	31	39	38	32	20	41	).1982.A
8018	63	6F	72	6E	73	6F	66	74	cornsoft
8020	00	48	8A	48	98	48	BA	BD	.H.H.H..
8028	03	01	C9	09	F0	34	C9	07	4..
8030	F0	53	C9	02	F0	43	C9	04	.S...C..
8038	D0	39	A2	FF	88	E8	C8	BD	.9.....

Expert Utilities - ROM Toolkit.

Info on Which ROM (0-F) ? F

ROM Title: **TERMINAL**
 Copyright: (C)1984 Acorn
 ROM Type: **Language & Service**
 Language Entry Point: **&AF77**
 Service Entry Point: **&9D72**

Press SPACE BAR to Return To The Menu.

◆ LISTING 1 ◆

```

5REM LISTING ONE (D7EE)
10MODE 7 (3BC5)
20ONERRORGOTO2300 (780B)
30PROCmenu (B271)
40DEFPROCoptR (1964)
50CLS (0E2F)
60PRINT"List of Currently
Present ROMs." (B4F7)
70A%=&FC:current%=((USR&FF
4)AND &FFFF)DIV 256 (F2D6)
80PRINT (289D)
90PRINT"Current Rom: ";~cu
rrent%; (8A74)
100PRINT' (65C4)
110FOR ROM=0 TO 15 (5CCB)
120IF ROM=8 THEN VDU 28,20,2
3,39,10 (B3CF)
130!&F6=&BF00:Y%=ROM (0084)
140B%=((USR&FFB9)AND &FF) (9
C8D)
150?&BF00=222:C%=((USR&FFB9)
AND &FF) (A1D2)
160?&BF00=B% (CE87)
170IF C%=222 THEN PRINT"Ram
";~ROM;" ";GOTO 190 (56BF)
180PRINT" ";~ROM;" "; (AC3C)
190IF ROM?&2A1=0 THEN PRINT;
"Empty":GOTO320 (AFC4)
200read=&8009 (B843)
210REPEAT (CBF5)
220!&F6=read (1165)

```

```

230Y%=ROM (25A2)
240chr=((USR&FFB9)AND &FF) (
DC75)
250IF chr=0 THEN 300 (DFCC)
260IF chr<32 OR chr>130 PRIN
T". ";GOTO290 (C793)
270PRINTCHR$(chr); (339C)
280IF read>&8016 THEN chr=0
(5492)
290read=read+1 (5D5C)
300UNTIL chr=0 (35EB)
310PRINT (E904)
320NEXTROM (B52E)
330?&FE30=current% (D0BE)
340VDU 26 (A460)
350PRINTTAB(0,18); (AEE2)
360PRINT'"Press Space To Re
turn To Menu...."; (68FF)
370REPEATUNTILINKEY(-99) (D7
24)
380ENDPROC (82CB)
390: (E0B6)
400DEFPROCoptS (76A8)
410CLS (2A93)
420PRINT (11A3)
430PRINT"ROM Save Routine"
(25D7)
440DIM command% 100 (C651)
450PRINT"Save Which ROM (0-
F) &";socket%=GET$(17DF)
460PRINTsocket% (33FD)
470socket%=EVAL("&"+socket%)
(EFC3)
480PRINT (2134)
490PRINT"Length of ROM (2/4/

```

```

8/16) ? ";:LOR$=GET$:length%=E
VAL("&"+LOR$) (EED0)
500IF length%=1 THEN PRINT"1
6":lor%=4000:length%=16:GOTO56
0 (0A81)
510PRINTLOR$ (91E5)
520IF length%=2 THEN lor%=80
0:GOTO560 (175D)
530IF length%=4 THEN lor%=10
00:GOTO560 (AEB2)
540IF length%=8 THEN lor%=20
00:GOTO560 (BCE7)
550GOTO490 (A59E)
560P%=2500 (8CC2)
570[opt2 (18EC)
580.rel LDA &F4 (F75C)
590PHA:LDA #socket%:STA &F4:
STA &FE30:LDA #0:STA &70:STA &
72:LDA #&30:STA &71:LDA #&80:S
TA &73 (8B60)
600.end LDY #0 (6D73)
610.go LDA (&72),Y (C8C9)
620STA (&70),Y:INY:BNE go:IN
C &71:INC &73:LDA &73:CMPI #(&8
0+length%*4):BNE end:PLA:STA &
F4:STA &FE30:RTS (CDAE)
630] (978F)
640CALL rel (B0E0)
650REPEAT (96B1)
660INPUT"Filename: "file$ (C
6BB)
670IF LEN(file$)>7 THEN 660
(56F6)
680UNTIL file$<>" (13D3)
690$command%="*SAVE "+file$+

```


E N H A N C E R S

```

" 3000 "+"STR$(lor%)+ " D9CD 80
00"+CHR$(13) (08DF)
700X%=command% MOD &100 (224
F)
710Y%=command% DIV &100 (606
B)
720CALL &FFF7 (07E3)
730ENDPROC (9A7A)
740DEFPROCmenu (7ED6)
750VDU 22,7 (FFA4)
760PRINT (AAF0)
770 PRINT;" ";CHR$150;"<";ST
RING$(34,"");"4" (0CDE)
780FOR CC=1 TO 2 (30B2)
790PRINT;CHR$141;" Enhance
rs. A&B ROM Toolkit" (4083)
800NEXTCC:PRINT;" ";CHR$150;
"-";STRING$(34,"");"%" (F10D)
810VDU 28,5,23,39,7 (87E2)
820PRINT"(S)ave (L)oad (
R)oms" (6467)
830PRINT"(D)ump (E)xit (
I)nfo" (49CB)
840PRINT"Which ? "; (451D)
850*FX 15,0 (2F9C)
860G$=GET$ (E658)
870PRINT;G$ (6D42)
880VDU 28,1,23,39,5 (E535)
890IF G$="S" THEN PROCopts (
389C)
900IF G$="L" THEN PROCoptL (
95F5)
910IF G$="R" THEN PROCoptR (
6B4F)
920IF G$="D" THEN PROCoptD (
84D0)
930IF G$="E" THEN PROCoptE (
14C0)
940IF G$="I" THEN PROCoptI (
C853)
950RUN (F28A)
960DEFPROCoptL (E6BC)
970CLS (4F5D)
980PRINT"Sideways RAM Load
r." (1CE7)
990INPUT"Filename ? "File$
(E078)
1000IF LEN(File$)>7 AND MID$(
File$,2,1)<> "." THEN GOTO990 (
789C)
1010IF LEN(File$)>9 THEN GOTO
990 (A282)
1020 PRINT"Ensure all switch
es are set to write, insert th
e disc and hit the Space bar."
(8EC1)
1030REPEATUNTILINKEY(-99) (4E
E4)
1040ACT$="L."+File$+" 8000" (
D21B)
1050OSCLI(ACT$) (C00C)
1060ENDPROC (CE43)
1070: (2262)
1080DEFPROCoptD (B11A)
1090CLS (17B6)
1100PRINT"Rom Hex/ASCII Dump.
" (8D71)
1110VDU 28,0,23,39,5 (EBB5)
1120PRINT"Dump which ROM (0-
F) ? "; (9B0B)
1130rom$=GET$:PRINTrom$ (0436
)
1140rom%=EVAL("&"+rom$) (A764
)
1150IF rom%>15 THEN 1120 (F2C
1)
1160DIMQ 200 (89A0)
1170FORPASS%=0TO2STEP2 (17CC)
1180P%=Q (F27F)
1190[OPT PASS% (F842)
1200.ST PHP:SEI (E244)

```

```

1210LDA#&80 (DB2F)
1220STA#72 (B186)
1230LDA#0 (B6C2)
1240STA#71 (0734)
1250STA#73 (1144)
1260LDA#&35 (724B)
1270STA#74 (5D61)
1280LDA#rom% (D12E)
1290STA#FE30 (C1D9)
1300LDX#&40 (43B2)
1310LDY#0 (ED78)
1320.LL LDA(&71),Y (6871)
1330STA(&73),Y (AB82)
1340INY (B3A3)
1350BNE LL (0F33)
1360INC#72 (92FF)
1370INC#74 (0583)
1380DEX (7991)
1390BNE LL (839E)
1400LDA#F4 (40C3)
1410STA#FE30 (6B1A)
1420PLP (C054)
1430RTS (3100)
1440] (8318)
1450NEXTPASS% (A3A4)
1460CALLST (C099)
1470: (32B6)
1480PRINT"Send to printer (Y
/N) ? "; (B18D)
1490G$=GET$:PRINT;G$:IF G$="Y
" THEN VDU 2 (326A)
1500PRINT"Press <SHIFT> to s
croll screen." (EAF6)
1510VDU 14 (8617)
1520FOR I#=&3500 TO &6FFF STE
P8 (851C)
1530PRINT";~I#&4B00;". "; (E
235)
1540FOR J#0 TO 7 (4C9A)
1550IF J#?I#<16 THEN PRINT;"0
";~J#?I#;" ";:GOTO1570 (5575)
1560PRINT;~J#?I#;" "; (8E31)
1570NEXT J# (7F77)
1580FOR J#0 TO 7:K#J#?I# (3
760)
1590IF K#>32 AND K#<127 THEN
PRINT;CHR$J#?I#;ELSE PRINT;".
"; (6AD9)
1600NEXT J# (656A)
1610NEXT I# (5A3A)
1620ENDPROC (3489)
1630DEFPROCoptE (9889)
1640PAGE=&1900 (0E8B)
1650CLS (5A6F)
1660*BASIC (72BD)
1670: (3ADC)
1680DEFPROCoptI (1D9B)
1690CLS (CBF6)
1700PRINT (96DC)
1710PRINT"Info on Which ROM
(0-F) ? "; (FE1A)
1720G$=GET$ (FC49)
1730IF ASC(G$)>70 OR ASC(G$)<
48 THEN 1720 (2FF8)
1740rom%=EVAL("&"+G$) (9212)
1750PRINTG$ (2A4B)
1760PRINT (6690)
1770: (3EE9)
1780m#=&8009 (0DCB)
1790Y%=rom% (F552)
1800serv%=FALSE:lang%=FALSE (
630E)
1810copy%=&8000+FNB(&8007)+1
(F499)
1820type%=FNB(&8006) (9B1B)
1830IF (type% AND 2)=0 AND ro
m%?&2A1=0 THEN PRINT"That soc
ket is Empty."::GOTO2140 (4F44
)
1840IF (type% AND 128) THEN s
erv%=TRUE (82AE)

```

```

1850IF (type% AND 64) THEN la
ng%=TRUE (3EFB)
1860z%=&8009 (A882)
1870title$=FNW (EFF3)
1880z%=z%+1 (0725)
1890ver$=FNW (4CF9)
1900z%=copy% (8A29)
1910copy$=FNW (48EA)
1920IF LEN(copy$)>22 THEN cop
y$=LEFT$(copy$,22) (E662)
1930: (427C)
1940PRINTCHR$132;CHR$157 (A5F
6)
1950PRINTCHR$132;CHR$157;CHR$
135;"ROM Title: ";title$ (1EA5
)
1960IF LEN(ver$)<5 THEN PRINT
CHR$132;CHR$157;CHR$135;"Versi
on: ";ver$ (405E)
1970PRINTCHR$132;CHR$157;CHR$
135;"Copyright: ";copy$ (0FE3)
1980PRINTCHR$132;CHR$157;CHR$
135;"ROM Type: "; (8318)
1990IF lang% THEN PRINT;"Lang
uage "; (1148)
2000IF lang% AND serv% THEN P
RINT;"& "; (A8FE)
2010IF serv% THEN PRINT;"Serv
ice"; (ED07)
2020PRINT (64B1)
2030IF NOT lang% THEN 2080 (0
426)
2040PRINTCHR$132;CHR$157;CHR$
135;"Language Entry Point: &";
(E61D)
2050lo%=FNB(&8001) (3E8B)
2060hi%=FNB(&8002) (277D)
2070PRINT;~hi%;~lo% (0BC8)
2080IF NOT serv% THEN 2130 (E
C74)
2090PRINTCHR$132;CHR$157;CHR$
135;"Service Entry Point: &";
(28D2)
2100lo%=FNB(&8004) (4B2B)
2110hi%=FNB(&8005) (1C00)
2120PRINT;~hi%;~lo% (60B5)
2130: (9F83)
2140PRINT"Press SPACE BAR to
Return To The Menu."::REPEATU
NTILINKEY(-99) (8584)
2150ENDPROC (EBD4)
2160DEFFNB(z%) (7B26)
2170!&F6=z% (3BFA)
2180=((USR&FFB9)AND &FF) (A35
3)
2190: (A665)
2200DEFFNW (40C7)
2210word$="" (6E06)
2220REPEAT (5A3E)
2230IF FNB(z%)<32 THEN word$=
word$+"":GOTO2250 (29BD)
2240word$=word$+CHR$(FNB(z%))
(4E72)
2250z%=z%+1 (3B39)
2260UNTIL FNB(z%)=0 (7AA0)
2270=word$ (F37A)
2280: (F34A)
2290 (BE4E)
2300REM"ERROR TRAPPING (41ED)
2310IF ERR=17 THEN RUN:REM re
runs program if ESCAPE pressed
, include when debugged (2EEA)
2320PRINT" "; (36C9)
2330REPORT (0FE9)
2340PRINT;" at Line ";ERL' (6
962)
2350PRINT"PRESS SPACE..." (93
F8)
2360REPEATUNTILINKEY(-99) (4C
9F)
2370RUN (2DFE)

```


◆ LISTING 2 ◆

```

5REM LISTING TWO - CREATE
(BC23)
10MODE 7 (3BC5)
20PRINT;" ";CHR$150;"<";STR
ING$(34,"");"4" (B867)
30FOR CC=1 TO 2 (5207)
40PRINT;CHR$141;" BASIC p
rogram ROM Image Creator" (388
9)
50NEXTCC:PRINT;" ";CHR$150;
"-";STRING$(34,"");"%" (5219)
60VDU 28,1,23,39,5 (2A20)
70INPUT"Basic Program File
name:"Fname$ (4DB6)
80IF LEN(Fname$)>9 THEN GOT
O70 (64D5)
90Action$="L."+Fname$+" 370
0":OSCLI(Action$) (7F54)
100param=&C00:file=&C20:$fil
e=Fname$+CHR$13:param?0=file M
OD 256:param?1=file DIV 256:A%
=5:X%=param MOD 256:Y%=param D
IV 256:CALL &FFDD (D8B2)
110CALL &FFDD (8914)
120exec=param?6+256*param?7
(0F40)
130L%=param?10+256*param?11
(87FD)
140IF exec<>&8023 AND exec<>
&801F PRINT"Sorry, Not a BAS
IC program. Try again.":GOTO
70 (784D)
150CLS:DIM GR(4):HIMEM=&3500
:PRINT" BASIC program length
:&";L%:FX 15,0 (C198)
160L%=L%+&100 (21C1)
170INPUT"Enter Desired Loa
d Address: "&bB$:11A%=EVAL("&
+bB$):1A%=11A% DIV 256 (3720)
180INPUT"Eprom title.(Max.10
):"T$ (DF8F)
190T$=LEFT$(T$,10):TL%=LEN(T
$) (2A56)
200INPUT"Author's name (Max.
15):"C$ (F432)
210C$=LEFT$(C$,15):CL%=LEN(C
$) (C086)
220INPUT"Activation command
(Max.10):"COM$ (E029)
230COM$=LEFT$(COM$,10):COM%=
LEN(COM$) (EAFB)
240FOR X%=0 TO 2 STEP 2 (024
0)
250P%=&3500 (D415)
260[OPT X% (503C)
270BRK (7B30)
280BRK (16FE)
290BRK (A2F2)
300JMP&8030 (4179)
310] (318E)
320?P%=&82 (4635)
330P%=P%+1 (FE61)
340?P%=(9+TL%) (CEE2)
350P%=P%+1 (5BF0)
360?P%=00 (CA8B)
370P%=P%+1 (D8BE)
380$P%=T$ (0592)
390P%=P%+TL% (43CB)
400?P%=00 (F8CA)
410P%=P%+1 (14E2)
420?P%=&28 (6B54)
430P%=P%+1 (97AC)
440?P%=&43 (71B5)
450P%=P%+1 (323D)
460?P%=&29 (6DCB)
470P%=P%+1 (B173)
480$P%=C$ (D3B1)

```

```

490P%=P%+CL% (4ADA)
500P%=&3530 (FC33)
510[OPT X% (DDC7)
520CMP #&04 (869B)
530BEQ ASEP (1518)
540RTS (D38B)
550.FINISH (D121)
560PLA (BA7D)
570TAX (1CAF)
580PLA (63BF)
590TAY (E52E)
600PLA (OCB0)
610RTS (9911)
620RTS (6546)
630.ASEP (D285)
640PHA (D573)
650TYA (EB07)
660PHA (9D28)
670TXA (6930)
680PHA (44EA)
690] (AE69)
700R%=P%+3 (5BED)
710FOR H%=1 TO COM% (F790)
720[OPT X% (54DD)
730LDA (&F2),Y (56B8)
740CMP #&00 (5887)
750BNE FINISH (6909)
760INY (C7F2)
770] (D639)
780NEXT H% (731B)
790 [OPT X% (DB8A)
800LDA (&F2),Y (04F9)
810CMP #&0D (3C89)
820BNE FINISH (1842)
830LDA #1A% (DAFD)
840STA #71 (ACCF)
850LDA #&82 (032E)
860STA #73 (6F07)
870LDA #&00 (9AB1)
880STA #70 (E7ED)
890STA #72 (E6CC)
900LDY #&FF (E8DA)
910.MAINLOOP (74D5)
920] (F3DC)
930S%=P% (780B)
940[OPT X% (22D6)
950LDA #73 (9F2A)
960CMP #&00 (FAAA)
970BEQ LASTLOOP (B5D8)
980INY (CD33)
990LDA (#72),Y (1773)
1000STA (#70),Y (9860)
1010CPY #&FF (4E5A)
1020BNE MAINLOOP (CA25)
1030INC #71 (1E54)
1040INC #73 (BAE4)
1050CLC (C299)
1060BCC MAINLOOP (786F)
1070.LASTLOOP (F60F)
1080INY (4C1A)
1090CPY #&00 (9A15)
1100BEQ DONE (F84A)
1110LDA (#72),Y (2A94)
1120STA (#70),Y (1639)
1130CLC (3F94)
1140BCC LASTLOOP (E051)
1150.DONE (D6E1)
1160LDX #&00 (1E8D)
1170LDA #&8A (D298)
1180LDY #&50 (6BEE)
1190JSR &FFF4 (9BF8)
1200LDY #&41 (DCE8)
1210JSR &FFF4 (47C1)
1220LDY #&2E (14B8)
1230JSR &FFF4 (C4C4)
1240LDY #&3D (2282)
1250JSR &FFF4 (6188)
1260LDY #&26 (1CDA)
1270JSR &FFF4 (E28D)
1280] (5523)
1290IF LEN(bB$)=3 THEN bB$="0
"+bB$ (A264)
1300FOR GY=1 TO 4 (3E42)
1310GR(GY)=ASC(MID$(bB$,GY,1)
) (2A49)
1320NEXT GY (89FF)
1330[OPT X% (D810)
1340LDY #GR(1) (C15D)
1350JSR &FFF4 (F1D0)
1360LDY #GR(2) (BF59)
1370JSR &FFF4 (72D5)
1380LDY #GR(3) (77EC)
1390JSR &FFF4 (9B0B)
1400LDY #GR(4) (0F61)
1410JSR &FFF4 (46D4)
1420LDY #&D (C2D0)
1430JSR &FFF4 (C5D1)
1440LDY #&4F (FOCA)
1450JSR &FFF4 (609D)
1460LDY #&4C (1A76)
1470JSR &FFF4 (E398)
1480LDY #&44 (D764)
1490JSR &FFF4 (0A46)
1500LDY #&0D (BF7C)
1510JSR &FFF4 (D68C)
1520LDY #&52 (495D)
1530JSR &FFF4 (5589)
1540LDY #&55 (7481)
1550JSR &FFF4 (F0C5)
1560LDY #&4E (0A5F)
1570JSR &FFF4 (73C0)
1580LDY #&0D (B0F3)
1590JSR &FFF4 (9A1E)
1600PLA (A73A)
1610TAX (01E8)
1620PLA (EF61)
1630TAY (69F0)
1640PLA (378C)
1650LDA #&00 (A06C)
1660RTS (5E7A)
1670] (60E2)
1680NEXT X% (99D8)
1690FOR X%=1 TO COM% (315D)
1700?R%=ASC(MID$(COM$,X%,1))
(FE0C)
1710R%=R%+7 (C9A0)
1720NEXT X% (E2F0)
1730PLH%=(L% DIV 256)+&82 (9F
92)
1740PLL%=(L% MOD 256) (9E97)
1750S%?3=PLH% (B2BC)
1760S%?24=PLL% (5468)
1770PRINT"The ROM image is n
ow located in memory at &4000
to &";"((&4200+L%)-1)";". It ca
n be""either loaded into side
ways RAM or Blown into an EPROM
(with appropriate hardware a
nd software)." (D1BC)
1780PRINT"Save to Disc (Y/N
)?"; (7BD8)
1790G$=GET$ (731E)
1800PRINT;G$ (9C7F)
1810IF G$="Y" OR G$="y" THEN
GOTO 1830 (A418)
1820PAGE=&1900:PRINT":*BASIC
(2C0A)
1830INPUT"Enter Filename:
"File$ (E06D)
1840IF LEN(File$)>9 THEN 1830
(C4EF)
1850IF (&200+L%)<&4000 THEN L
en$="4000" (EBC6)
1860IF (&200+L%)<&2000 THEN L
en$="2000" (B1F3)
1870IF (&200+L%)<&1000 THEN L
en$="1000" (931C)
1880IF (&200+L%)<&400 THEN Le
n$="400" (78F2)
1890Action$="SAVE "+File$+"
3500"+Len$+" D9CD 8000" (AD34
)
1900PRINT" ";Action$ (B22E)
1910OSCLI(Action$) (C756)

```


PRINTING FROM VIEW

Since the launch of Acorn's VIEW range of business software for the BBC Micro, many people have struggled to get to grips with Acorn's User Guides in an attempt to learn how to use the VIEW word processor, the ViewSheet spreadsheet and their companion database, ViewStore. At last there is a book to help beginners and advanced users alike with all three programs. Titled 'Mastering VIEW, ViewSheet and ViewStore', this new guide to the VIEW software family is written by computer journalist Clive Williamson, who is no stranger to using VIEW on the BBC Micro, as he used it to write his two previous books: 'Getting the most from your BBC Micro' and a companion book about the Acorn Electron; both for Penguin.

Clive's latest offering is a deliberate attempt to flesh out the restricted information currently provided by Acorn with the Master and Master Compact, and contains sections on getting started with all three major VIEW programs. As well as catering for the complete beginner, the book is full of hints and tips for the more experienced user, and should help people at home, at school, or in small businesses to get the best from their software. VIEW, ViewSheet and ViewStore are all dealt with individually, and there is an additional section on integrating all the members of the VIEW family, so that the results from one or more program can be used within another. This facility is often under-used or completely overlooked, but it is well worthwhile as linking the VIEW programs can greatly increase their versatility in many situations. For example, data held in ViewSheet and ViewStore can be 'spooled' into the VIEW word processor to create a complex report, and this method can be used to great effect in a business situation, in the classroom, or by a club secretary.

As well as the major VIEW programs, Clive Williamson also covers the use of the peripheral VIEW family software: the Printer Drivers, Printer Driver Generator, ViewSpell, ViewIndex, ViewPlot and the new OverVIEW upgrade for the Master 128. 'Mastering VIEW, ViewSheet and ViewStore' also contains specific help for those using the earlier 1.4 and 2.1 versions of VIEW, and shows how to make the best use of monitors, disc drives and printers.

An easy to use setting-up program for printing from VIEW

Setting up print styles

The program below is taken from 'Mastering VIEW, ViewSheet and ViewStore', and is a utility to help people with the VIEW software to set up the print styles and facilities on Epson dot matrix printers at the start of each session. It is chiefly designed for use with the LX80 and LQ800 printers, but also works with the FX, RX and MX80 FTIII models and any other Epson-compatible printers. The program offers a menu of printer functions, including selection of near letter quality (NLQ), print style, proportional spacing and switching the US or UK character set so that a pound sign is reproduced in place of the American hash (#). It should be run from BASIC before entering VIEW, ViewSheet or ViewStore (or any other software which produces a printed output). Once the required selections have been made from the menu, you can go straight into VIEW or a similar program from menu option 9. Some of the available typefaces are shown in Figure 1.

To enter the listing you should be in BASIC, and you will probably find the AUTO facility and the COPY keys particularly useful. Leave out line 780 until the program is fully developed and saved to disc or tape, because you will lose all your work if the micro changes to VIEW or any other language before you are ready! Make at least two copies of the program on different discs, and use the AUTO-BOOT facility (*OPT 4,3) to CHAIN the program each time you begin working at the micro. After studying your printer manual you may decide to enter your own values inside the brackets associated with each PROCon and

PROCOff in order to adapt the program for your own needs or for different models of printer.

The effects that the program switches — along with the codes required to switch them — are as shown in Table 1. In each case the character codes sent to the printer are preceded by the ESCAPE character, code 27. FX Series owners may like to replace the NLQ option with condensed print. Use PROCon1(15) and PROCOff1(33) in line 620. Some other possible effects are shown in Table 2 and instead of *WORD, line 760 could be used to switch on ViewSheet (*SHEET), or ViewStore (*STORE), or to *EXEC a file of set-up instructions for any of the VIEW programs.

NB: If you intend to use VIEW's Epson Printer Driver after running this program, you will encounter a slight snag: the Printer Driver will reset all the printer functions each time it prints, so if you have switched your printer to a special font or print style then you will find that the changes are lost immediately you issue a PRINT or SHEETS command from VIEW! To avoid this you should make up your own version of the Epson driver with Acorn's Printer Driver Generator program using the 'answerfile' called A.FX4. This is a set of ready-made answers to the questions posed by the PDG software about your printer. Make sure you respond 'N' for No for the very first question 'Include printer initialization?'. Then you can use the same answers as the answerfile throughout by pressing the RETURN key each time. Load your new Printer Driver instead of FX4, and you will then be free to set up your printer to any required typeface or effect from the Printer Menu program, and these effects will be preserved when you go to a VIEW program and begin printing.

A rundown of the program

PROConit (lines 330-420) defines strings for use in the program (mainly the colours for the Teletext display) and sets up the 'choice' array ready to hold a record of the menu selections.

C O N T I N U E S ►

PROCpage (100-210) turns the cursor off (110), defines a fixed text window on screen (120), then sets up a white banner for the heading and a blue background for the menu itself.

PROCprinton (230-310) is a prompt to switch on the printer and initialize it (ie set all the printer functions to their default state).

PROCselect (440-790) is the main section of the program, first printing the available menu options on screen from the DATA list in lines 530 and 540, then allowing keys 1 to 9 to be

pressed to choose from the options. PROCon and PROCoff are used to send the necessary sequences of control codes to the printer to turn on and off those functions which use a only single code after ESCAPE (character code 27), while PROCon1 and PROCoff1 are used for any printer functions that require two extra codes to make them work. As each number is chosen, the cyan display changes to white on the menu, acting as a reminder of those functions already selected. The array 'choice(input)' is used for this. Because selections 6 and 7 are interlinked on the LQ800, there is an extra routine to change

the screen display of one if the other is selected.

Lines 1100-1130 turn the cursor on and restore the screen window to normal in the event of the ESCAPE key being pressed.

NB: The program in this article is taken from the Sigma Press book 'Mastering View, Viewsheet and Viewstore', and is the copyright of Clive Williamson and Symbiosis Recording & Design, 1987.

'Mastering VIEW, ViewSheet and ViewStore' by Clive Williamson is published by Sigma Press and distributed by John Wiley and Sons Ltd, price £12.95.

Table 1.

EFFECT	CODE: ON	CODE: OFF
NLQ	120,1	120,0
Double Strike	71	72
Emphasized	69	70
Italic	52	53
Proportional	112,1	112,0
10 Pitch	80	77
15 Pitch	103	77
US/UK	82,3	82,0
VIEW	*WORD	-

Table 2.

EFFECT	CODE: ON	CODE: OFF
Deselect paper end detector	56	57
Unidirectional printing	85,1	85,0
Enlarged characters	87,1	87,0
Select Courier font (LQ series only)	107,2	107,0

Table 3 Compatibility of Menu programme with Epson printers.

OPTIONS	LQ800	LX80	FX Range	RX Range	MX80 FTIII
NLQ	X	X	-	-	-
Double Strike	X	X	X	X	X
Emphasised	X	X	X	X	X
Italic	X	X	X	-	-
Proportional	X	-	X	-	-
10 Pitch	X	X	X	X	-
15 Pitch	X	X	-	-	-
US/UK	X	X	X	X	X

◆ LISTING ◆

MASTERING VIEW, VIEWSHEET & VIEWSTORE

CLIVE WILLIAMSON

```

10 MODE7: REM (c) CLIVE WILLIAMSON 1987
11 ON ERROR GOTO 1100
20 DIM menu$(9)
30 DIM choice(9)
40 PROCinit
50 PROCpage
60 PROCprinton
70 PROCselect
80 END
90 :
100 DEFPROCpage
110 VDU23,1,0;0;0;0;
120 VDU 28,3,31,39,5
130 FOR A%= 0 TO 3:PRINT TAB(0,A%);white$;ground$
140 NEXT
150 PRINTTAB(9,1);CHR$(141);blue$;T$
160 PRINTTAB(9,2);CHR$(141);blue$;T$
170 FOR B%= 4 TO 23
180 PRINT TAB(0,B%);blue$;ground$
190 PRINT TAB(3,B%);cyan$
200 NEXT
210 ENDPROC
220 :
230 DEFPROCprinton
240 PRINT TAB(12,7);"TURN PRINTER ON"
250 PRINT TAB(7,9);"(then press the SPACE BAR)"
260 input=GET
270 REPEAT UNTIL input=32
280 PRINT TAB(12,7);SPC(15)
290 PRINT TAB(7,9);SPC(26)
300 VDU2,1,27,1,64,3: REM initializes the printer
310 ENDPROC
320 :
330 DEFPROCinit
340 T$="EPSON PRINTER MENU"
350 white$=CHR$(135)
360 blue$=CHR$(132)
370 cyan$=CHR$(134)
380 ground$=CHR$(157)
390 FOR N=1 TO 9
400 choice(N)=FALSE
410 NEXT N
420 ENDPROC
430 :
440 DEFPROCselect
450 PRINTTAB(10,6);"OPTIONS"
460 FOR C%=1 TO 9
470 READ menu$(C%)
480 z=8
490 y=z+C%
500 x=6
510 PRINTTAB(x,y);cyan$;C%;" ";menu$(C%)
520 NEXT
530 DATA NLQ,Double-strike,Emphasised,Italic,Proportional
540 DATA 10 Pitch (default 12 Pitch),15 Pitch (default 12 Pitch),
UK Character Set (default US),VIEW
550 REPEAT

```

C O N T I N U E S ►


```

560 PRINTTAB(10,20);"YOUR CHOICE?";
570 input=GET
580 IF input<49 OR input>57 PROCbeep:GOTO 570
590 input=input-48
600 ON input GOTO 620,640,660,680,700,720,740,760,780
610 UNTIL FALSE
620 IF choice(input)=FALSE THEN PROCon(120,1) ELSE PROCoff(120,0)
630 GOTO 560
640 IF choice(input)=FALSE THEN PROCon1(71) ELSE PROCoff1(72)
650 GOTO560
660 IF choice(input)=FALSE THEN PROCon1(69) ELSE PROCoff1(70)
670 GOTO560
680 IF choice(input)=FALSE THEN PROCon1(52) ELSE PROCoff1(53)
690 GOTO560
700 IF choice(input)=FALSE THEN PROCon(112,1) ELSE PROCoff(112,0)
710 GOTO560
720 IF choice(input)=FALSE THEN PROCon1(80) ELSE PROCoff1(77)
730 PRINTTAB(6,9+input);cyan$:choice(input+1)=FALSE:GOTO560
740 IF choice(input)=FALSE THEN PROCon1(103) ELSE PROCoff1(77)
750 PRINTTAB(6,7+input);cyan$:choice(input-1)=FALSE:GOTO560
760 IF choice(input)=FALSE THEN PROCon(82,3) ELSE PROCoff(82,0)
770 GOTO560
780 *WORD :REM could *EXEC a file instead
790 ENDPROC
800 :
810 DEFPROCbeep
820 SOUND 1,-12,50,8
830 ENDPROC
840 :
850 DEFPROCon(X,Y)
860 PRINTTAB(6,8+input);white$
870 VDU2,1,27,1,X,1,Y,3
880 choice(input)=TRUE
890 ENDPROC
900 :
910 DEFPROCoff(X,Y)
920 PRINTTAB(6,8+input);cyan$
930 VDU2,1,27,1,X,1,Y,3
940 choice(input)=FALSE
950 ENDPROC
960 :
970 DEFPROCon1(X)
980 PRINTTAB(6,8+input);white$
990 VDU2,1,27,1,X,3
1000 choice(input)=TRUE
1010 ENDPROC
1020 :
1030 DEFPROCoff1(X)
1040 PRINTTAB(6,8+input);cyan$
1050 VDU2,1,27,1,X,3
1060 choice(input)=FALSE
1070 ENDPROC
1080 :
1100 REPORT
1110 VDU23,1,1;0;0;0;
1120 VDU26
1130 END

```

NLQ text on the LQ800
 Normal text on the LQ800
Double Strike printing
Emphasized print
Italic style print
 Proportionally spaced text
 10 Pitch text
 15 Pitch text here looks very small
 This is a pound sign: £
 and this is the hash: #
 Here is Sans Serif text
 (only from a Font module)

Figure 1 Range of typefaces
 possible using the Menu program
 with the Epson LQ800 printer.

A&B FAX SHEET

ACK:

Acknowledge: Non printed character used in comms protocols dealing with block transfers (such as XMODEM and MODEM7). This character indicates that a block has been received, and that the next block can be sent – see also EOB.

ANSI:

American National Standards Institute: A standards organization offering (in this case) a standard in languages, comms protocols and other associated items – see also ASCII.

ARQ:

Automatic Repeat Request: – this is a form of data error correction.

ASCII:

American Standard Code for Information Interchange: This is an alternative name for the International Telegraphic Alphabet No. 5 – a 7 bit code used to represent common characters and comms instructions. (it is transmitted as an 8 bit signal with 1 bit to indicated parity).

ASR:

Automatic Send Receive: Any terminal capable of generating a message into some form of off line storage for later transmission – this includes paper tape telex machines and microcomputers.

ASYNCHRONOUS:

Communications that rely on “stop” and “start” bits to synchronize both originator and receiver of data – there are asynchronous protocols as well as asynchronous hardware devices.

BAUDOT:

This is a 5 bit data code used in telex and RTTY transmissions.

BELL:

This is the common name for the American telephone company and also a number of their own telephone and data transmission standards such as Bell 103a, 202a, 212a... and so on.

BISYNCHRONOUS:

An IBM protocol involving synchronous transmission of binary coded data (known as BCD). Now being used outside of IBM hardware and software.

BLAISE:

An acronym for **British Library Automated Information Service**, an on line host system with a substantial database of computerised information.

BREAK:

A non printed character used in some transmission protocols and is still found on some terminals – traditional keyboard input is via <Ctrl> I.

BROADBAND:

A specific transmission cabling system enabling much higher data traffic rate (traditionally 12 times greater than simple voice grade transmissions). This is used when many simultaneous transmissions take place.

BSC:

Binary Synchronous Communications – see also Bisynchronous.

CALL ACCEPT:

In PSS jargon, this means that the packet sent to a receiving party is willing to accept (and proceed with) the call.

CALL REDIRECTION:

In PSS jargon, this means that a call can be automatically redirected from original address to another address – ideal for automatic data distribution services.

CALL REQUEST:

This is a packet sent to initiate a data call.

CCITT:

Comite Consultatif International Telephonique et Telegraphique – this is a committee that specifies the international comms standards. CCITT tones are used worldwide apart from in the USA where Bell tones are the standard. CCITT also set the standards for V series and X series protocols.

CHARACTER TERMINAL:

In PSS a terminal which can only gain access via a PAD – see also PAD.

CLUSTER:

Also a networking term. When two or more terminals are linked to a data channel at a single point.

COMMON CARRIER:

A comms resource providing information services for the general public.

CONNECT TIME:

This is the length of time a user is connected to the remote computer. This is different to CPU time which is more common on time share systems – see also CPU time.

CPS:

Characters Per Second: a term also used with printing characters on a screen or a hard copy device.

CPU TIME:

In an on line session, the number of times the CPU spends on your tasks (remember you are invariably on a multi user environment) is calculated as CPU time. An example of CPU time could be 10 seconds after 30 minutes of communications.

CRC:

Cyclic Redundancy Check: An error correction and detection facility. Used in serial transmissions and cassette tape transmissions for detecting errors in data.

CUG:

Closed User Group.

DCE:

Data Circuit-Terminating Equipment: IBM for a Modem or similar device – often hardware.

DIALUP:

A call initiated via a PTSN, no matter where the call is directed afterwards.

DTE:

Data Terminal Equipment: IBM for computers.

DUPLEX:

Communications protocol whereby transmission is in two directions simultaneously. Sometimes called Full Duplex.

Communications jargon can be some of the most confusing “buzz words” there are, think back how many times you have had more than one manual open when doing a bit of hacking! After all, do you know the difference between V21 and V23, can you wire up an RS232 cable to an RS432 socket without looking in both the Beeb’s manual and the Archimedes manual, do you have an up to date list of telephone numbers supporting modems, do you have an accurate breakdown of the RS232 interface’s connections and requirements?

This is a guide for the totally perplexed, the comms conversant or even just a handy set of notes for the Hacker. We will be updating these pages as we go along, so you can add them to your collection.

Also inside these pages are all of the important diagrams for RS232 connections on the BBC Micro and the Master. “How to” information regarding wiring up your own cables. A comprehensive list of Bulletin Board services and their numbers and an up to date glossary on many of the specialised protocols you will find when using a modem.

A&B FaxSheets – the first in a series to cut out and keep.

CIC/DIC:

Extended Binary Coded Decimal Interchange Code - This is an IBM alternative to ASCII. Based on an 8 bit signal, this is usually transmitted synchronously. Now losing its popularity as ASCII is now standard on the IBM PC and other smaller machines.

ECHO:

When a remote computer sends back to the terminal each letter as it receives it for confirming redisplay locally. It also reflects the effect of long comms lines caused by successive signal amplification.

ENQ:

A non printed character signifying an enquiry and is often sent by host computers as they are dialled up. When the user's terminal receives an ENQ request, it may be programmed to send out a password automatically.

Secure computer establishments has special terminals with encrypted ENQ 'labels' blown into ROM or the software of the terminal for added security.

EOB:

End of Block: This is a non printed character used in some transmission protocols. Usually this is used in association with ACK.

EPAD:

A variation on the PAD theme. This enables error correction facilities between the PAD computer and the user's terminal.

EQUALIZATION:

A method by which distortion over comms channels are smoothed out, and data compensation factors are introduced.

FDM:

Frequency Division Multiplexing: This is a widebandwidth transmission medium (for example coaxial cable) supporting a number of narrow bandwidth comms channels.

HANDSHAKING:

This is a hardware and software rule for remote devices to communicate with each other. These include supervisor signalling such as acknowledge, transmit, and terminal ready.

HAYES PROTOCOLS:

This is the standard for intelligent modems for single or small multi user establishments. Often supported by software packages, Hayes Codes are used for switching baud rates, protocols, and other facilities.

HOST (COMPUTER):

This is often referred to as the big computer - but it can represent any computer system you are using a Modem or a data cable to access.

ISO:

International Standards Organization - see also EBCDIC, ANSI and ASCII.

KERMIT:

A standard public domain comms package supporting error correction (and detection) and is often used by

microcomputer owners to transmit files over voice grade communications lines. Versions of Kermit exist for the BBC Micro and the Archimedes, not to mention the PCs and many other computer systems - including mainframes.

KSR:

Keyboard Send Receive: This is often used by simple 'dumb' terminals such as Teletypewriters, Digilogs and some of the simpler computer packages.

LAN:

Local Area Network: Normally using coaxial cable or 'twisted strand'. LANs operate at high speeds over an office or works site. Some LANs have interconnect facilities enabling PTSN or PSS communications.

LF:

Line Feed: Usually an unprinted character on the screen - the code for moving the cursor to the next line is reserved for <Ctrl> J. It is not the same as a carriage return which merely sends the cursor to the beginning of a new line.

MACRO:

A software facility found in many software packages permitting the preparation and sending of commonly used strings of data such as a password sequence or a logon sequence.

MODEM:

An acronym for **MOD**ulator **DEM**odulator. The device that is used to take digital information and turn it into an audio signal. At the other end the **MODEM** takes the audio information and reconstructs it into digital information.

MODEM7:

A file transfer protocol similar to XMODEM but very specialised.

MULTIPLEXER:

A device which divides a data channel into two or more independent data channels.

MULTISTREAM:

The British Telecom alternative PSS service making it more friendly to use - it uses EPAD and VPAD.

MVS:

Multiple Virtual Storage operating system used by IBM main frames. This system was developed in the mid 70's and is still widely used in data processing/comms applications - it has been superseded by CICS.

NUA:

Network User Address: On PSS, these are the twelve terminal identification digits. Dumb terminals do not have this facility as they use the PAD.

NUI:

Network User Identity: Used in PSS for dial up access by users.

On Line Service:

Interrogative (or query service) available for dial up systems. These include Blaise, Dow Jones, Reuters...

ORIGINATE (MODE):

A setting for a modem operated by users about to access another computer.

OSI:

Open Systems Interconnect: This is the intended standard for digital networks – see SNA.

PACKET TERMINAL:

A terminal capable of creating packets of information (on PSS) using a packet network.

PAD:

Packet Assembly/Disassembly: This is a device that permits the "ordinary" terminals to be connected up to a PSS system by providing all the necessary terminal addressing headers and protocol conversions.

PARITY CHECK(ING):

A technique of error correction in which one bit is added to each data character so that the number of bits are always odd or even.

POLLING:

A method of controlling terminals on a clustered data network where each is called in turn by the computer to see if it wishes to transmit or receive.

PROTOCOL:

An agreed set of standards or rules as dictated by a group and adhered to by everyone.

PSE:

Packet Switching Exchange: This is a method by which packet switches can be achieved whilst inside a network.

PTSN:

Public Switched Telephone Network: The voice grade telephone system dialled from a telephone. Other services use the PTSN system such as Faximile transmissions and low speed data transfers (typically up to 1200/1200). Prestel uses the PTSN system to transmit data.

PTT:

This is the common term for the publicly owned telephone communications authority in other countries.

REDUNDANCY CHECKING:

A method of error correcting data corrupted on voice grade (and digital) lines – also referred to as CRC or Cyclic Redundancy Checking.

RS232 (C):

This is the standard serial communications interface for most popular microcomputers. The BBC Micro uses a variant called RS432 whereas the Archimedes uses a slightly newer variant called RS423. All are compatible with each other within reason. – Also known as CCITT V.24.

RTTY:

Radio Teletype: This is the method by which data is transmitted over the radio waves. It is a five bit data signal and is commonly used in navigation systems and international transmissions. Some Reuters nodes still use RTTY terminals for international news retrieval.

SECONDARY CHANNEL:

This is a data channel used for supervising the flow of data in a professional network or low cost lease-line system. In V.23,

which is usually 1200 baud half duplex, supervisor traffic is at 75 baud. It is essentially a cheap form of obtaining full duplex.

SERIAL:

Data transmitted through the RS232 interface is serial because the data is physically and sequentially broadcast. This means that you can broadcast data using a simple two cable connection. Parallel transmission (such as on special networks and computer peripherals (including printers) is faster, but requires more wire in order to handle 8 or more bytes of data.

SNA:

Shared Networking Architecture: IBM's abortive attempt at introducing a networking protocol standard – see OSI.

SPOOLING:

A simultaneous peripheral operation whilst on line. If you spool to disk, you are essentially saving everything typed on the screen as a file to be examined later. You can also spool to printers, and other output devices.

STX:

Start Text: A non printed character used in some communications protocols.

SYN:

A non printed character used in synchronous transmission to inform a local device to start its local timing mechanism.

SYNCHRONOUS:

Data transmission in which timing information is superimposed on pure data. Under this method "start/stop" techniques are not used, and data exchange is more efficient.

TELEX:

PTSN based low speed text only data transfer service supported worldwide.

VPAD:

A variant on PSS PAD which allows Videotex (Prestel compatible) terminals to operate with all of the features of BT's multistream.

VT32/VT100:

These are both industry standard general purpose computer based terminals with limited storage capacity and no processing power, but they can be locally programmed to accept a variety of different ATPs. This is a DEC standard and both are often emulated using software on the BBC Micro.

XON/XOFF:

A pair of non printed characters used in protocols to tell devices when to start or stop sending thus controlling buffer overflow. These can be forced by sending <Ctrl> Q for XON and <Ctrl> S for XOFF.

NBBS Essex; Brentwood (0277) 228 867

NodeRunner BBS; High Wycombe (0494) 881 289

Patnet; Colchester (0206) 844 813

PD-Sig Fido I; Crowborough (08926) 61 149

PD-Sig System; Uxbridge (0895) 420 164 also on (0895) 52685

QMC Viewdata; Basingstoke (0256) 471 757

RICBBS; Basildon (0268) 710 637

RSGB; London (0707) 52 242

SBBS; Watford (0923) 676 644

Sky; Guildford (0483) 275455

Staines BBS (0784) 65794

TBBS Gamlingay; Sandy; Beds. (0767) 50 511

Trinity 2; Faringdon (0367) 81 507

Trinity 3; Reading (0734) 484 847

Vampire's Coffin; Weybridge (0932) 245 593

24 Hrs; 3/1275; subscribers only
10pm-7am; 3/1275; Atari 520STFM
Daily 8pm-8am; 12 Hrs; runs on a Spectrum
24 Hrs; 3/1275; PD software
24 Hrs; 3-24

24 Hrs; 1275v; Queen Mary's College
MF: 5pm-10pm; WE: 24 Hrs
24 Hrs; 1275v
9pm-11am plus 11pm-6am daily; 3/1275
MF: 6pm-8am WE: 24 Hrs; 1275v
24 Hrs; 3-24
24 Hrs; 3-24

24 Hrs; 3/1275
24 Hrs; 1275v; Viewdata & scrolling

The Midlands

Access Fido; Worcester (0905) 52 536

Bloxam; Banbury (0295) 720812

Digital Matrix Fido; Birmingham (021) 705 5187

TABBS; Tamworth (0827) 281713

Keyboard; Milton Keynes (0908) 668 398

Norview; Northants. (0604) 20 441

Sponge; Leicester (0936) 77025

Wolverhampton BBS (0902) 745 337

24 Hrs; 3-24
Daily 10pm-1am; 300
24 Hrs; 3/1275

9pm-8am; 1275; 464/664; Trivia
8pm-8am excl. Tues & Thurs; 12 Hrs
24 Hrs; 1275v
24 Hrs; 3/1275
24 Hrs; 3/1275; MS-DOS; CP/M

North East England

49'ers; Cleveland (0287) 43 920

Kirklees ITeC; Batley; Yorks (0924) 442598

LEMS Fido; Leeds (0532) 600 749

Hamnet; Hull (0482) 465 150

LEMS BBS; Leeds (0532) 600749

MBBS Leconfield (0401) 50 745

OBBS Bradford (0274) 480 452

On-Line Systems; Cleveland (0429) 234 346

Stockton Fido; Teeside (0642) 588989

The Sharrow BBS; Ripon (0765) 707 887

Daily 10pm-4am; 3/1275; FBBS colour for BBC users
24 Hrs; 1275v
Daily 10pm-8am; 3/1275
MF: 6pm-8am; WE: 24 Hrs; 3/1275
24 Hrs; 3/1275; Wildcat system
24 Hrs; 3/1275
24 Hrs; 3/1275; Colour for BBC users
24 Hrs; 3-24; Viewdata & scrolling
24 Hrs; 300
24 Hrs; 3/1275; Viewdata & scrolling BBC based

North West England

Bolton BBS (0204) 43082

CNOL; Lancaster (0254) 60 399

Fido Compulink North; Liverpool (051) 220 3761

Fido Manchester (061) 773 7739

Liverpool Mailbox (051) 428 8924

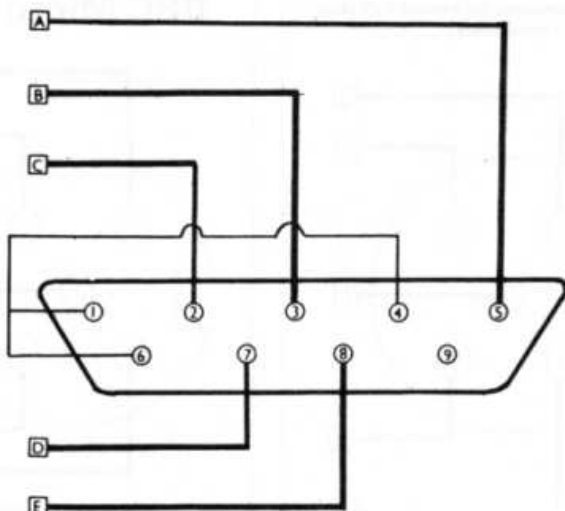
Matrix; Liverpool (051) 737 1882

MF: 8pm-8am; WE: 24 Hrs; 3-24; 8am-8pm on ring back
24 Hrs; 300; Clinical BBS for medics
24 Hrs; 3/1275
24 Hrs; 3/1275
24 Hrs; 3-24; UK TBBS HQ system
24 Hrs; 3/1275; Multi-user

9-way 'D' Type plug wiring (viewed from solder side).

Pins 1,4 and 6 are to be joined as indicated.

PIN NO.	FUNCTION
1	DCD (Join to 4 & 6)
2	RX
3	TX
4	DTR (Join to 1 & 6)
5	GND
6	DSR (Join to 1 & 4)
7	RTS
8	CTS
9	RI (Not Connected)



Archimedes RS432

London Area

Airtel - TBBS (01) 200 3439
Brixton ITeC (01) 735 6153
Communitel (01) 968 7402
Dark Crystal Fido (01) 207 2989
Distel (01) 679 1888

Gnome at home (01) 888 8894
Hackney BBS (01) 985 3322
Health data (01) 986 4360
Hendon Fido (01) 200 7577 &
(01) 220 8281

Infotel ROS (01) 581 3376
ITCU Training (01) 960 4742
Link Fido (01) 659 6992
London Underground (01) 863 0198
Marctel (01) 346 7150

MBBS Mitcham (01) 648 0018
Metrotel (01) 941 4285
NBBS London (01) 883 5290
NNBBS London (01) 455 6607
Nottingdale Tec. Ctr. (01) 968 6033

OSI Lives (01) 429 3047
Owritel (01) 927 5820
PC Access (01) 853 3965
Poly Fido (01) 580 1690
TBBS Rovoreed (01) 542 4977
TBBS London (01) 348 9400
Techno Line (01) 450 9764
Techno-line 2 (01) 452 1500

Twilight Phone Fido (01) 624 5338
WYBS Wimbledon (01) 542 3772

South East England

Acorn BBS; Cambridge (0223) 243 642
Andrew's Fido; Aylesbury (08444) 4833
ARCNET; Colchester (0376) 518 818
Audio Output, Weybridge (0932) 244906

Banat Board; Oxford (0865) 882 872
BITEC; Basildon (0268) 22 177
BITEC; Basildon (0268) 25 122
BOOG BB; Fleet; Hants. (0252) 626 233

CATS Fido; Maidenhead (0628) 824 852
C View Rochford; Kent (0702) 54 6373
CATS BBS*; Maidenhead (0628) 824 852

CIX; Guildford (0483) 573 337 or
(0483) 573 338
Datsoft Opus; Ilminster (04605) 4615
Dr Solomon's Fido; (02403) 4946
Amersham

Fido PD Software; (0342) 315 636
East Grinstead
Folkestone TBBS (0303) 42690
Gosport Apricot BBS (0705) 524 805
LABBS; Surrey (0883) 844 164
Lasermail Fido; Worthing (0903) 212 552
Maptel; Southend (0702) 552 941

Mirrorworld; Surrey (0883) 844044/844164
(0932) 245593

24 Hrs; 3/1275
24 Hrs; 1275
24 Hrs; 1257v
24 Hrs; 3-12
24 Hrs; 300; Display
electronics 3-1275 on
(01) 679 6183
24 Hrs; 1275v
24 Hrs; 1275v
24 Hrs; 1275v
24 Hrs; 3/1275
Opus system
24 Hrs; 3/1275
24 Hrs; 1275v
24 Hrs; 3-12
24 Hrs; 3-24 Wildcat BBS
24 Hrs; 3/1275 FBBS
system
24 Hrs; 3/1275
24 Hrs; 1275v
24 Hrs; 3/1275
24 Hrs; 3/1275
24 Hrs; 1275v;
Communitel system
24 Ring back; 300
24 Hrs; 1275v
24 Hrs; 3-24 for PC users
24 Hrs; 3-12
24 Hrs; 3-24
24 Hrs; 3-12
24 Hrs; 1275v
MF: evngs; WE: 24 Hrs;
1275v
24 Hrs; 3
Sat 7pm - Mon 8am;
3/1275

24 Hrs; 1275v
24 Hrs; 3/1275
24 Hrs; 300
24 Hrs; 3/1275 Viewdata &
scrolling
24 Hrs; 3-24; FidoNet UK
24 Hrs; 1275v
24 Hrs; 300
24 Hrs; 3/1275; MS-DOS;
CP/M
24 Hrs; 3/1275
24 Hrs; 1275v
24 Hrs; 3/1275; V22bis
coming
24 Hrs; 3-24; Multi-user
24 Hrs; 3-24
24 Hrs; 3-24
24 Hrs; 3-12
24 Hrs; 300
24 Hrs; 3/1275
24 Hrs; 3/12
24 Hrs; 300; commercial
system
24 Hrs; 3/1275
24 Hrs; 1275v; Viewdata &
scrolling

Might Micro; Manchester (061) 224 8117

OBBS Manchester (061) 427 1596
Portal; Wirral (051) 355 0911

Pyramid; Leigh; Lancs. (0942) 609 611
Stoke ITeC (0782) 265 078
TeePee Link; Manchester (061) 494 6938
Telemax 15; Macclesfield (0625) 33 703

Scotland

Aberdeen ITeC (0224) 641 585
A.L.A.N. Fife (0592) 860313
Betelgeuse 5; Inverness (0463) 231 339
Kirklees ITeC; Batley (0924) 442598

Livingstone BBS; (0506) 38 526
Livingstone
People's Palace; Glasgow (041) 956 6537

Northern Ireland

Deep Thought Fido; (0247) 467 863
Bangor
PBBS I Portadown (0762) 333 872

Channel Islands

Jersey Fido (0534) 39 389

Common Prestel Demonstration Nodes:

South (01) 618 1111
Midlands (021) 618 1111
North (061) 618 1111
Scotland (041) 618 1111
ID: 4444444444
Password: 4444

Codes

3 V.21 (300 baud)
1275 V.23 (12/75)
12 V.22 (1200/1200)
24 V22bis (2400/2400)
3-12 V.21, V.23, V.22
3-24 V.21, V.23, V.22, V.22bis
v viewdata graphics
s scrolling (non viewdata)
h half duplex
r/b ring back
* Fido Net node

Most systems are: 8 bits no parity
1 stop bit.
Viewdata 7 bits,
even parity,
1 stop bit.

games
MF: 6pm-9am; Sun: 24 Hrs;
3/1275; Fido/Opus
Commercial system
24 Hrs; 3/1275
MF: 8pm-6am; WE: 24 Hrs;
3/1275
24 Hrs; 3
24 Hrs; 1275v
24 Hrs; 3-24
24 Hrs; 3/1275

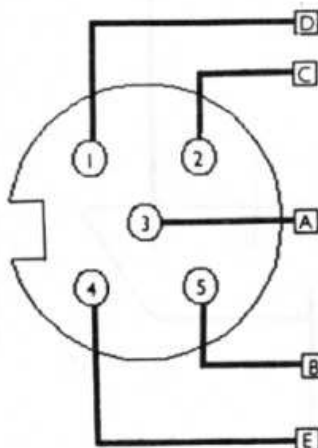
24 Hrs; 1275v
9.30pm-8am; 3
24 Hrs; 3/1275
24 Hrs; 1275v; Information
Technology Centre
24 Hrs; 300

Daily 6pm-8am; 3/1275

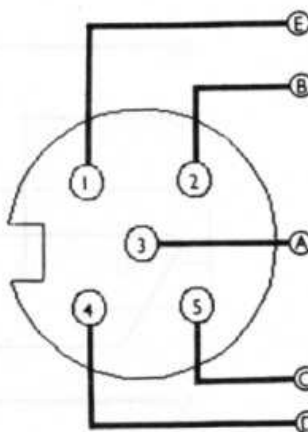
24 Hrs; 3-24; PC-DOS;
CP/M; BBC
Daily 10pm-1am; ring back;
300

24 Hrs; 3/1275

Wiring connections for second DIN plug
(if using two connectors).



BBC Micro RS232/RS423



5 pin "Domino" type wiring
(viewed from solder side).

PIN NO.	FUNCTION
1	RTS
2	RX
3	GND
4	CTS
5	TX

Watford Electronics

Jessa House, 250 Lower High Street, Watford WD1 2AN, England

Tel: Watford (0923) 37774 Tlx: 8956095 Fax: 01 950 8989



Acorn

The choice
of Experience

Shop Hours: 9am to 6pm (Mon.-Sat.) Thursdays 9am to 8pm

All prices exclusive of VAT; subject to change without notice & available on request.

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The choice
before and after
the experience

Archimedes *micro*

NEW LOW PRICES

305 Series

● Entry System	£679
● with Green Monitor	£729
● with Colour Monitor	£879

310 Series

● Entry System	£749
● with Green Monitor	£810
● with Colour Monitor	£949

310M Series

● Entry System	£799
● with Green Monitor	£855
● with Colour Monitor	£999

440 Series

● Entry System	£2265
● with Green Monitor	£2314
● with Colour Monitor	£2465

(Securicor carr. £10 on Micros)

Archimedes SPECIAL OFFER

FREE, £125.00 worth of Hardware

With every Archimedes Micro purchased from us, we are giving away absolutely **FREE** a 5 1/4" double sided disc drive with PSU, (1 Megabyte unformatted), plus the special Archimedes interface cable, worth **£125**. This package is absolutely essential if you want to run BBC software or IBM software with your Archimedes, in the emulation mode.
(P.S. This offer does not apply with 0% finance scheme mentioned in column two).

● 0.5 Mb RAM for 305	£85
● Podule Backplane	£37
● ROM Podule (Computer Concepts)	£46
● Archimedes Ref Manual	£29
● ARM Assem. Lang Prog Manual	£12
● 2nd 800K floppy disc drive (for 305, 310 & 410)	£118
● Econet Network Board	£40
● Backplane for 2 podules, with fan (305, 310)	£39
● I/O Podule (with User port, Analogue port & 1MHz bus)	£75
● MIDI add-on to I/O Podule	£27
● ROM Podule (takes five 8 bit ROMs, of 16, 32, 64 or 128K)	£56
● Real time Video Digitiser (Watford)	£249
● Sound Sampler (Armadillo)	£105
● 20 Mb Hard Disc for 300's	£469

Archimedes Printer Lead	£7.00
Archimedes Monitor Lead	£7.50

WORDPROCESSORS

Wordwise +	£18	View	£49
Image Writer	£23	Viewspell	£32
Interword ROM	£35	Viewindex	£12
1st Word Plus	£79		

DATABASES

System's Delta Plus			£60
AlphaBase	£39	Delta Plus	£57
Viewstore	£49		

SPREADSHEETS

Intersheet ROM	£35	Viewsheets	£49
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BUSINESS GRAPHICS

GammaPlot	£30	Interchart ROM	£22
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INTEGRATED PACKAGES

Logistix - Database, Spreadsheet, Time Management & Business Graphics	£95
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PC EMULATION Pack

(for 310, 410 & 440), including MSDOS 3.21	£66
--	-----

GRAPHICS, ART & DESIGN

Interchart	£25	Gamma Plot	£30
Artisan	£31	Gamma Plus	£60
Zarch	£16	Toolkit (Beebug)	£32
		Toolkit (Clares)	£31

LANGUAGES

ANSI 'C'; ISO-PASCAL; FORTRAN 77;	£95 each
Cambridge LISP; PROLOG X	£181 each
TWIN EDITOR	£27
Archimedes Assembler	£199

0% (APR) FINANCE

For a limited period, Watford Electronics are able to offer the Archimedes range of microcomputers at **0% (APR)** finance. Credit facility available subject to status. Please inquire for further details.
(Watford Electronics are Licenced Credit Brokers)

CREDIT TERMS now available.
Please telephone or write in for further information.

Archimedes to BBC SERIAL LINK

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers. Using this package it is possible to transfer any data from the BBC to Archimedes at upto 19200 baud.
By far the easiest way to transfer data to your new computer.

Only £25

Archimedes 5 1/4" / 3 1/2" Disc drive Interface

With this interface it is possible to connect almost any 5 1/4" / 3 1/2" disc drive with its own power supply to the Archimedes. NO SOLDERING is involved. Supplied complete with necessary lead.

Only £19

Note: This is not simply a lead. Attempting to connect an external disc drive by direct connection may result in damage to your Micro.

Watford Electronics are the main Approved Stockist of ACORN SPARES and ECONET Referral Centre

The 80186 Co-Processor

This package consists of the Master 512 board, Watford Co-Pro Adaptor, 1770 Disc Upgrade and Acorn ADFS. This is a complete package, with its own power supply, ready to interface with your BBC Micro. The Master 512 board using the 80186 16 bit Processor at 10MHz and running Digital Research DOS Plus, gives a high degree of IBM compatibility at an extremely reasonable price. Included in the 512k package is a mouse and the amazing Digital Research GEM suite of software; GEM Paint, GEM draw and GEM desktop giving a complete Mouse Icons environment (All other GEM packages will work on the 512k). Famous packages that will work with the 512k board include Wordstar, Dbase II, Lotus 123 and many others. The only requirement to upgrade any BBC Model B to this system is you must have twin 80 track disc drives.

£259

BBC MASTER

BBC MASTER 128K Micro incl.
Acorn's: View, Viewsheets, ADFS,
BASIC Editor & TERMINAL plus £125
worth of FREE OFFER (see below)

£379

SPECIAL OFFER

FREE... £105 worth of Hardware
& Software

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics, Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control and Watford's 3 1/2", double sided 1 Megabyte (unformatted) single disc drive complete with cables, ready to connect to the micro - with every BBC Master purchased from us this month.

BBC MASTER with Turbo Board +
above SPECIAL OFFER £475

512K Processor Add on Board
"inc. Mouse and GEM package" - £185
BBC AIV (Domesday) System £3999

ADD-ONS & ACCESSORIES

Turbo 65C102 Add-on Module	£95
Econet Module for the Master	£40
Twin ROM Cartridge for Master	£7.50
Quad ROM Cartridge for Master	£11
Universal Processor Adaptor	£75
Master Reference Manual I	(No VAT) £14
Master Reference Manual II	(No VAT) £14
Master Advance Ref. Manual	(No VAT) £19
64K Upgrade Kit for B+	£32
Acorn 1770 DFS Kit complete	£41
ECONET Upgrade Kit for BBC	£42
ALL ECONET UPGRADES Available	
ARIES' Professional IEEE Interface	£238
Acorn IEEE Interface Complete	£265
Morley Teletext Adaptor with ATS Rom	£99
Filestore E01	£825
Filestore E20	£699

BBC MASTER COMPACT

System 1	Standard Package	£310
System 1A	System 1 + TV Modulator	£322
System 2	System 1 + Green Hires Monitor	£364
System 3	System 1 + Medium Res Colour Monitor	£478
RS232 Kit for BBC Compact		£25
Additional 3 1/2" Drive for BBC Compact		£90
	(Securicor carriage £7)	

65C102 2nd PROCESSOR

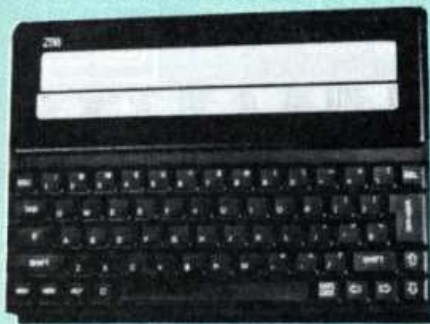
(65C102 replaces the original
Acorn 6502 2nd Processor)

This amazing package consists of the Acorn 65C102 'Turbo' Board, the Watford Co-Pro Adaptor and Acorn 1.2 DNFS ROM. The 'Turbo' board, running at 4MHz with 64k of additional RAM will increase the speed by between 50 and 200% depending on the application running, and allow a BASIC program of upto 44k in any screen mode. Simply by plugging in the Co-Pro and the DNFS ROM with its special Tube host code and you massively increase the power of any Model B. This is a complete package, with its own power supply, ready to interface with your BBC Micro.

£135

Continued

Z88 Sinclair's Portable Micro



The worlds first, truly portable Micro. It is A4 size, only an inch thick and weighs under 2lbs. Ideal for use when travelling or as a personal organiser.

Only: **£239**

FREE

With every Z88 purchased from us this month, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

ACCESSORIES

Mains Adaptor	£8.65
32K RAM Pack or 32K EPROM Pack	£17.35
128K RAM Pack or 128K EPROM Pack	£43.40
512K RAM Pack	£169
Z88 to BBC Link	£21.70
Z88 to PC Link II	£30
Z88 EPROM ERASER	£34.75
Serial Printer Cable	£8.65
Parallel Printer Cable	£24.00
Z88 Modem	£86.90
Z88 Soft Carrying Case	£8.50
Sinclair Z88 Computing Book	£9.95
AA Nicad Rechargeable Battery	£1.50
Battery Charger, Compact & Fast (3 Hours)	£6

CO-PRO Adaptor



Now for the first time you can add the Master Co-processor boards, to your standard BBC model B, or B Plus. With this brand new launch from Watford Electronics you can attach any BBC Master co-processor to the original BBC Micro. Once again Watford strides ahead with a new concept in BBC B Micro add-ons. This unique external Co-Pro Adaptor, is protected by patent applications.

Use the super fast Turbo Board with your BBC B, it is much faster than the 6502 2nd processor superseding it.

With the 512K add-on your standard BBC machine achieves IBM PC compatibility at a realistic price running GEM, Lotus 123 and many other programs. Included with the 512k package is a high precision mouse and the Digital Research GEM suite of software; GEM Desktop, GEM Write GEM Paint. This requires both the 1770 DFS and the ADFS to be fitted to your computer.

To use other co-processors you require a BBC B with DNFS 1.20 or higher, or BBC B+ fitted with 1770 DFS 2.20 or greater. Co-processors work exactly like a second processor.

Master owners may use Co-Pro to add a second Co-processor externally. Watford, brings power to your BBC at only:

£35 (carr £5)

SPECIAL OFFER

EPROMs for BBC's Sideways ROMs.

2764-250nS £3.00

27128-250nS (12V5) £3.25

27128-250nS (21V) £5.25

RAMs (Low power) for ATPL, WATFORD, etc., Sideways ROM Boards

6264LP (8K) £5.50

2 x 6264LP (16K) £10.50

NEW

BBC PCB DESIGNER

At last! A PCB design package for the BBC Micro that eclipses some industry CAD software. Hard to believe, isn't it? Just look at some of the impressive package specification:

- Library Component Designer
- Component Library (over 200 parts)
- Component List Editor
- NetList Editor
- PCB Board Designer
- Plotter Driver
- Dot Matrix Printer Driver

This integrated suite of programs is packed full of sophisticated PCB related features making the design of a circuit board a dream instead of a nightmare.

Input for the design may be manual, taking components from the library and connecting them, or highly automatic starting from a netlist and list of components. In auto mode, PCB Designer will never allow you to forget a connection again! And of course, either in manual or auto mode, connectivity is maintained no matter how you later move the parts around and route the tracks. Connections snap together and angles are corrected. Through hole vias and track thickness are established automatically and many more features, far too numerous to mention here, are included in the system.

Some of the PCB Designer's features are:

- Over 120 library pad sizes/shapes
- Four colour adjustable palette
- Zoom range 2:1 to 1:4
- Highlighting of specific tracks
- Normal and surface mounted components
- Rapid screen review
- Menu driven
- Variable gridlock
- Switchable measurement grid
- Pre-select pan/scroll facility
- Large 24" x 24" Board size
- Copy route facility
- Connectivity held at all times
- Ratsnesting of part connections
- Auto-placement of text references
- Text linked to parts
- Automatic placement of vias
- Printer and plotter outputs provided
- Comprehensive manual

TYPES OF PLOT OUTPUT

Top and bottom track artworks, top and bottom silkscreens, solder resist mask, drilling detail drawing and check plot. All these may be with pad holes on/off, scale of 2:1 or 1:1, board edge on/off, 90 degrees rotation, mirror image, width of pen, x & y offsets and batch plots to disc.

The above is only a taste of the superb features of this software, surely capturing previously unknown performance from the BBC Master computer. BBC B owners will need to fit at least one block of sideways RAM, Shadow screen memory and a disc drive. A trackerball or a mouse is also required.

BBC PCB Designer is supplied on a 32K PAL PROM and comes complete with two discs and a comprehensive manual containing examples and useful information on PCB design.

By the way, as a bonus, PCB Designer is also suitable for many other schematic drawing applications such as circuit diagram drawing.

Introductory Offer: £99

(Please write in for further technical details)

Archimedes Real-Time Digitiser

Watford's Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air television signals may also be digitised via a video recorder or TV tuner.

Once captured, Video images can be stretched, squashed, rotated, stored on disk, printed, or used by applications software.

Applications include desktop publishing, graphics, animation, image analysis and recognition, medical imaging, automatic inspection and measurement, databases, interactive video, remote transmission of pictures via a modem, movement detection ... or anything else you can think of!

SPECIFICATION

SOFTWARE

All the driver software for the digitiser is contained in a ROM on the podule. Facilities provided include:

- Grabbing of images to the screen or dumping to memory.
 - Continuous grabbing and display for previewing or camera alignment.
 - 'Hot key' grabbing - pressing a (configurable) key combination grabs and displays an image on the screen while another program (e.g. paint software such as Artisan) is running.
 - Scaling (zoom/shrink) any section of an image to any size in X and Y directions, with optional X/Y flip, window clip and logical (AND/OR/XOR) plotting.
 - Rotation and scaling to any angle and size, rotating about any point, with optional window clip, and logical (AND/OR/XOR) plotting.
 - Very versatile matrix printer screendump facility for Epson FX, LQ and EX compatible printers - pictures can be printed to ANY size (including multiple sheets) at any orientation, using any available printer density and one of six internal sets of dot patterns, or with user definable patterns (pattern editor supplied). The screen-dump can also be used for general purpose graphics screen printing.
 - Pixel value lookup tables: pixel values can be passed through a user defined lookup table to allow contrast enhancement, thresholding pseudo-colouring etc.
 - Smoothing and noise spot removal to enhance image quality.
 - Creation of sprites from all or part of a digitised image.
 - Saving and loading of digitised images in compressed format.
 - Combination of pictures by adding, averaging, subtracting, multiplication etc.
 - Much faster versions of the Arthur *ScreenLoad and *ScreenSave commands.
- Software facilities are accessed via operating system star (*) commands and SWI calls. High resolution screen modes using MultiSync type monitors are supported.

UTILITY DISK

A disk is included, containing sample pictures, examples and utility programs including the following:

- Colour image grabbing using colour filters with monochrome or colour cameras, including colour balance adjustment and scaling facilities.
- Pattern editor for 2 colour display modes and printer screendumps.
- 512 line interlaced display for non MultiSync monitors.
- Thresholding to create two colour images.
- Capture and replay of animated sequences.
- Several example programs illustrating the use of digitiser software.

RESOLUTION

Images are digitised to 512 (h) x 256 (v) pixels, and then scaled to fit the Archimedes' screen. It is possible to digitise to 512 x 512 pixels if the picture is stationary for about 0.1 second. 512 x 512 images can either be displayed on a MultiSync monitor, or on a normal monitor using interlacing.

Pictures are digitised to 64 levels of grey (6 bits). Note, however, that it is only possible to display all 64 levels on a monochrome monitor, or a colour monitor which has a composite (CVBS) input. For this reason, the Philips CM8533 monitor is recommended instead of the standard Archimedes monitor. It is also possible to connect both a colour and a monochrome monitor at the same time.

Any 2,16 or 256 colour graphics mode can be used to display digitised pictures. In two colour modes, grey levels are represented using dot patterns, which may be redefined if required (a pattern editor is supplied).

SPEED

Video fields are captured in real time (1/50th sec.), and then transferred to Archimedes' memory or the screen. The grab/display rate is dependant on the screen mode and picture size, up to 25 fields per second for quarter screen images, or 12.5 per second for fullscreen (Mode 9).

HARDWARE

The digitiser is a single width podule, with a BNC socket on the rear panel for the video input, which may optionally be terminated via a link. There is 128K of on-board memory to store the digitised image, and a 32K ROM on the podule contains all the driver software.

Automatic video level control and black level clamping circuitry is used to ensure that the optimum contrast is obtained from a variety of video sources. A filter is included to avoid patterning effects when using colour sources.

Price £249



Watford Electronics

Distributors of: Electronic Components, Micro Computers & Peripherals



250 High Street, Watford, WD1 2AN, England. Tel: Watford (0923) 37774. Telex: 8956095 WATFRD. Fax: 01-950 8989

AT LAST! THE FIRST TRULY PORTABLE PERSONAL COMPUTER

FREE With every Z88 purchased from us this month, we are giving away absolutely **FREE**, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

The Z88 is smaller than an A4 pad, weighs less than 2lb, and measures only 7/8" thick. No other portable personal computer offers so much, in so small a package . . . and at so small a price:

JUST £239.00 PLUS VAT

Memory

The Z88 comes with 32K of RAM built in, of which around 20K is available – enough for about 2,000 words of text. This is easily expandable to 416K by simply slotting in additional RAM packs (see back cover). With the introduction of soon-to-be-released 1 Mbyte packs, total RAM of 3 Mbytes will be available – enough to hold the complete works of Shakespeare.

Keyboard and display

The Z88 has a full QWERTY keyboard with virtually silent, short-travel keys. It includes special function keys, such as $\diamond$, $\square$, INDEX and MENU which make it exceptionally easy for novice users to quickly find their way around the sophisticated built-in software.

The screen is a state-of-the-art supertwist LCD, which provides a massive improvement on normal displays in both contrast ratio and viewing angle – providing a clear, sharp read-out. The screen's format is 8 lines $\times$ 106 characters, and provides a large working area of 8 $\times$ 94.

The remainder of the screen area consists of sections which hold menu details (including all the Z88's commands); a unique page map (which shows you where you are on a complete page); diary date; filing and directory details; and operating system details which give you information on the Z88's status (such as battery strength).

Software

The Z88 comes with a built-in suite of applications software, which is exceptionally capable, yet extremely easy to use.

The operating software, OZ, allows you to switch between, for example, word processing and spreadsheet applications – without the delay of loading separate disk-based software into the computer's memory. With the Z88, it's just a matter of pressing a couple of keys.



Built-in applications software includes *Pipedream*, which features word-processing, spreadsheet and database functions.

Word Processing Facilities include block marking and movement, searching and replacing, and multi-column layout. The display is fully WYSIWYG (What You See Is What You Get), showing bold, italics, underlining, centering, and dynamic page breaks as they appear on the printed page. Each page of the document is represented by a page map which shows the layout of the text.

Spreadsheet Invaluable for financial planning, this application allows you to define a series of formulae within cells (where a row and a column meet) and then to enter a series of numerical variables for manipulation. It allows profit and loss, cashflow and budgets to be quickly and easily arrived at.

Database This works on the same principle as spreadsheet – so data being stored for later retrieval is held in a known cell where it can, for example, be manipulated into ascending sequence.

Diary The Z88 diary software is a free-form

log that can be configured in any way you choose, within the constraints of the Z88's memory. It's particularly useful when used with the Z88's calendar and clock to find dates and set alarms.

Popdowns include a powerful calculator, clock, calendar and alarm. A printer editor allows you to configure Z88 codes to match a wide range of printers, and to store printer definitions if you're using more than one type.

Resident programming language is BBC BASIC with assembler. Communications to the outside world are achieved using a VT52 terminal emulation mode or the Import/Export facility which allow transmission and receipt of data files between the Z88 and other PCs.

Power supply

The Z88 runs on four commonly available AA batteries, which provide around 20 hours of active computing, or a year on standby mode. Switching off puts the Z88 into standby; all data in RAM stays live, drawing minimal power from the Z88's batteries. And when the batteries need to be changed, a special capacitor (or the mains adapter) preserves the data.

CONTINUED ON LAST PAGE OF ADVERT ►



Z88 – £239 + VAT



FREE With every Z88 purchased from us this month, we are giving away absolutely **FREE**, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

Z88 is a complete Personal Computing System

All prices in this advert are exclusive of VAT.

The Z88 is much more than a stand-alone personal computer. It's the core of a comprehensive computing system, that allows you to take full advantage of the computer's remarkable potential. Accessories and peripherals include:

RAM Packs Up to three RAM packs can be plugged into the front of the Z88. They require no external power, and are available with 32K and 128K capacity. 1 Mbyte RAM packs will be available in the first quarter of 1988.

32K £17.35 128K £43.40

EPROM Packs Erasable Programmable Read Only Memory packs are the Z88's archiving medium, and are available in 32K and 128K. Whereas other machines have to rely on cassettes, diskettes or hard disks, EPROMs offer *solid-state* storage with very rapid access to data and absolute reliability. 1 Mbyte packs will be available in the first quarter of 1988.

32K £17.35 128K £43.40

EPROM Eraser When a data file has been saved onto an EPROM pack, it stays there until you decide to erase all the data on it. At that point, simply insert the pack into the EPROM Eraser, which completely deletes the data – leaving you with a blank EPROM pack, ready for re-use.

£34.75

PCLINK A package consisting of software diskette and RS232 serial cable, PCLINK allows the transfer and receipt of files between the Z88, and an IBM or compatible PC. As well as standard ASCII files, it converts Pipedream files into either Wordstar or Lotus files.

£21.70

Z88-BBC LINK connects the Z88 to the BBC Micro for file transfer purposes. Pipedream is compatible with View Professional.

£21.70

Serial Printer Cable connects the Z88 to any printer with a standard serial port.

£8.65

Parallel Printer Cable connects the Z88 to any printer with a standard parallel port.

£24.00

Modem BABT-approved, 300 baud, line-driven, full duplex unit that allows the Z88 to talk to other computers via telephone lines.

£86.90

Mains Adapter helps preserve battery life, and is useful when the Z88 is in constant use in a fixed position.

£8.65



**CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383**



Watford Electronics

Jessa House, 250 High Street, Watford, WD1 2AN, England. Tel: Watford (0923) 37774. Telex: 8956095 WATFRD. Fax: 01-950 8989



All Monitors are supplied complete with BBC connecting leads FREE.

MICROVITEC 14"

- 1431 - Standard resolution as used on the BBC television computer programme £175
- 1451 - Medium resolution, suitable for word processing in mode 0 £225
- 1441 - High res, exceeds the capabilities of the BBC micro £359
- 1431AP RGB + PAL and AUDIO £199
- 1451AP RGB + PAL and AUDIO £255
- 2030 CS 20" Med Res £380
- 2040 CS 20" Hi Res £675
- Dust Cover for Microvitecs £5.50
- Touchtec 501 Touch Screen £239

TAXAN 12" & 14"

- TAXAN Super Vision 2 Type 620 Hi-res RGB Colour monitor. Ideal for Wordprocessing £263
- TAXAN Super 3, Type 625 Ultra Hi-res, RGB Colour) Text mode switch allows monochrome text display in Green, Amber, White reverse or White on Blue £313
- TAXAN 14" Multisync 770 Plus - An autoscanning Ultra high res, colour monitor. Ideal for Archimedes, IBM & Compatibles £495
- NEC JC-1401P3EE 14" Multisync Ultra Hi-res Intelligent Colour monitor. Auto scans frequencies between 15KHz to 35KHz. Text switch provides 7 colours for Database & wordprocessor. £489

PHILLIPS Monochrome 12"

- BM7502 Hi-res Green £69
- BM7522 Hi-res Amber £74

STAR BUY

- PHILLIPS 14" Hi-Res, dark glass, attractively finished Colour Monitor - supplied complete with RGB, SKART and Audio/Phono inputs. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display.

ONLY £195

ZENITH 12"

- Amber (New Design) Hi-resolution £72
- N.B. carriage on Monitors £7 (securicor)

SPARE LEADS

- BNC Lead for Zenith or Philips £3
- Skart Monitor Lead £5
- RGB lead for TAXAN Monitors £3

SWIVEL BASES



for Video Monitors

Our professional type swivel bases have front adjustable control. This alleviates the need to lift the monitor when adjusting the viewing angle.

for 12" Monitors £7 (carr. £2.50)

for 14" Monitors £10 (carr. £2.50)

Anti-Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for all wordprocessor users. Hundreds of these screens are in daily use in various branches of one of the leading High Street banks.

£12

TAXAN KP-815 PRINTER

80 column, Bi-directional, 160 CPS, (NLQ 24cps); Friction & tractor feed + paper roll holder as standard; Epson FX compatible.

Offer Price £159

KAGA/TAXAN PRINTERS

(IBM/Epson compatibles)

- Kaga KP915 Printer £275 (carr £7)
- RS232 Interface £49
- RS232 Interface with 2K Buffer £69
- RS232 Interface with 16K Buffer £89

Panasonic KX-P1081



Attractively finished in BBC beige. Bi-directional, logic seeking. Has IBM and Epson RX compatible command calls. Speed: 120CPS draft mode, 24 CPS NLQ mode. Character width range from 5 cpi to 17 cpi. Up to 40 downloadable characters. Functions include, Proportional spacing, Justification, centering and left & right ranging.

(Price includes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

Special Price: **£145** (carr. £6)

Optional RS232 Interface: **£39**

Panasonic KX-P1082

This superb printer is very similar to the popular KX-P1081 printer but at 160 cps (40 cps in NLQ), a lot faster.

(Our LOW price also includes £35 worth of FREE BBC Cable and Dump Out 3 ROM).

Introductory Offer: **£172** (carr. £7)

Panasonic KX-P3131 Daisy-Wheel Printer

This low-cost high-performance Daisy Wheel printer is ideal for anyone wishing to produce clear, immaculate letters or reports. It delivers, flawless text at 10, 12 & 15 CPS. Supports proportional spacing. Is Bi-directional, logic seeking. Printing speed: 17CPS. Has 6k printer Buffer. A printer of similar spec could cost a lot more than our ridiculously low price of:

Only £245 (carr. £7)

- Single Sheet Feeder £175
- Tractor Feed £90
- Daisy Wheel (various) £12
- Panasonic KX-P3131 Ribbon £4.50

FREE extra 32K Printer Buffer with every KX-P3131 purchased from us this month.

NEC P2200 PINWRITER

24 pin; 80 column; 168CPS - 56CPS LQ; Epson LQ compatible, 7K Buffer; 7 resident FONTS, Friction & Tractor feed, front load single sheet feed, etc.

Price: **£285**

- Cut Sheet Feeder £59
- Additional Font Cartridge £27
- NEC P2200 Pinwriter Ribbon £6.50

VARIOUS PRINTERS & ACCESSORIES

- Brother HR20 Daisy Wheel £349
 - HR20 Tractor Feed Attachment £110
 - Epson EX800 Printer £395
 - Epson EX1000 Printer £529
 - Epson FX800 Printer £295
 - Epson FX1000 Printer £389
 - Epson GQ3500 Laser Printer £1290
 - Star LC10 Printer £175
 - Star LC10C Colour £215
 - Epson LQ500 Printer £275
 - Epson LQ800 Printer £399
 - Epson LQ850 Printer £419
 - Epson LQ1050 Printer £529
 - Epson LQ2500+ Printer £749
 - Epson LX800 Printer £189
 - Epson SQ2500 Printer £975
 - Epson Paper Roll Holder £17
 - EX800/1000 Colour Option £55
 - EX800/1000 Colour Ribbon £18
 - EX800 Cut Sheet Feeder £130
 - EX1000 Cut Sheet Feeder £195
 - FX/LQ/LX800 Single Sheet Feeder £135
 - FX/LQ1000 Single Sheet Feeder £169
 - Hi-80 Refills - Set of 4 Pens £7
 - LX800 Cut Sheet Feeder £75
 - LQ800 Tractor Feed £44
 - LQ1000 Tractor Feed £50
 - LQ2500 Cut Sheet Feeder £195
 - LX1000 Cut Sheet Feeder £305
 - Hitachi 672 Colour Plotter £475
- (Securicor Carriage on Printers £7)

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer.

- RS232 £27 RS232 + 2K Buffer £52
- IEEE 488 £65 RS232 + 8K Buffer £62

INTEGREX COLOUR JET PRINTER

- Colour Jet 132 Printer £515
- Paper Roll £6
- Screen Dump Software £10
- Colour Cartridge £14
- Black Cartridge £8
- 100 A4 OHP transparencies £55

PRINTER SHARERS

(Ideal for School environment)

- | | | |
|---------------------------|--------|------------|
| Connects | Serial | Centronics |
| 2 BBC Micros to 1 Printer | £25 | £26 |
| 3 BBC Micros to 1 Printer | £36 | £35 |
| 6 BBC Micros to 1 Printer | - | £99 |

PRINTER CHANGER

- 3 Printers to 1 Micro (Centronics) £65
- (Cables extra, specify type required when ordering)

Professional Printer Stand



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed

and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

£26 (carr. £2.50)

Continued →

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities - he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible Printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from BASIC and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

PRINTER LEADS

Centronics lead to connect BBC micro to EPSON, KAGA, SEIKOSHA, NEC, STAR, JUKI, BROTHER, SHINWA, Panasonic etc. printers.

Standard length (4 feet long)	£6
Extra long (6 feet long)	£8
Compact's Special Centronics Lead	£9
RS232 Cable	P.O.A.
IBM Parallel 1 metre Cable	£7
Double ended 36 way Centronics Lead	£9

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
BBC Micro	-	£3.50
BBC Master	-	£4.00
Archimedes Micro pair	-	£9.00
Brother HR15/20	£3.00	£5.00
EX/LQ800	£7.50	£4.50
EX/LQ1000	£8.00	£5.00
RX/FX80/85/800/MX80	£4.00	£4.95
RX/FX100/1000	£6.00	-
Kaga/Texas KP810/815	£5.25	£4.00
LQ2500	£9.00	£5.50
LX80/86	£4.00	£4.50
LX800	£4.00	£4.75
M1009/GLP	£4.00	£3.75
Panasonic KX1080/81	£4.50	£4.75
SQ2500	£25.00	£5.50
Star NL10	£4.00	£4.50
Microvitec Metal	-	£5.50

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Listing Paper (Perforated)

● 1,000 Sheets 9 1/2" x 11" Fanfold Paper	£7
● 2,000 Sheets 9 1/2" x 11" Fanfold Paper	£12
● 1000 Sheets 9 1/2" x 11" NCR 2 Part Fanfold	£19
● 1,000 Sheets 15" x 11" Fanfold Paper	£9
● 1000 Sheets true A4 Fanfold Paper	£11
● 2000 Sheets true A4 Fanfold Paper	£20
● Teleprinter Roll (Econo paper)	£4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50. 2K Sheets £3.00

PRINTER LABELS

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	£5.00
1,000 90 x 36mm (Twin Row)	£4.90
1,000 90 x 49mm (Twin Row)	£7.50
1,000 102 x 36mm (Twin Row)	£6.25
Carriage on 1,000 Labels £1.00	

MEGABUFFER 256



This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. It allows the computer to print 256,000 character in a short time thus freeing the computer very quickly. In short it makes light work of printing large documents, screen dumps, etc. It is extremely simple to connect. The features are:

- Low Cost, High performance.
- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatibility with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in test unit for both the buffer & your printer.

In conclusion it can safely be said that MEGABUFFER 256 is the ultimate printer Buffer for both the amateur and professional user.

Only £125 (carr £2)

OFFICE MASTER



CASHBOOK - A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trail balance.

FINAL ACCOUNTS - Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST - A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER - A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS - Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL - Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only £21 (Disc)

OFFICE MATE



- DATABASE
- BEEBCALC SPREADSHEET
- BEEBLOT GRAPHICS

DATABASE - Set up a computerised card index system with powerful search facilities.

SPREADSHEET - Offers many calculation and editing features.

BEEBLOT - Provides visual representation from Spreadsheet data.

OFFICE MATE Only £10 (Disc)

New Launch Offers Disc Drives DP35-800S



A Double disc drive - with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master Series is the 5.25 inch disk, the standard for the future will most certainly be the smaller; faster and more reliable 3.5 inch disks - now a standard feature of both the Master Compact and the Archimedes Series.

To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system - called the DP35 800S, it contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk - leaving you more space to work with.

The 5.25" disc drive is 40/80 track switchable. For ease of access, the switches are front mounted. DP35-800S has its own power supply, independent of the BBC Micro.

Watford's new plinth enables users to read, write and format disks both in DFS and ADFS format - currently the accepted standard for the Master Compact and the Archimedes, it also enables the user to read disks written for the Archimedes. Ideal for both BBC & Master.

Launch Offer: £165 (carr. £7)

OKIMATE COLOUR PRINTER

The first ribbon transfer printer in its price range which offers fully versatile colour or black printing. A 24 element print head produces more than 100 shades with exceptional clarity. Ideal for use with Quest Paint or AMX Super Art.

Only: £139

BBC Screen Dump	£10
Colour Ribbon	£6
Black Ribbon	£6

30 Megabyte Winchester Drive



Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.

This 30 Megabyte hard disc is completely compatible with the Acorn ADFS - that's why we have bundled it with each Winchester drive, along with a full user guide and full utilities including file copy, 1000K save routines, Format and Verify - in fact all you need and more.

Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working - just compare the price with our competitors' 20 or 28 Mbyte discs!

Compatible with the Master, and the BBC B (with 17" X disc interface).

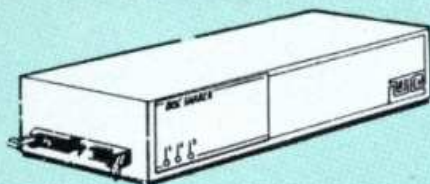
Launch Offer £425 (Carr. £12)

Panasonic KX-P1083

Fast 240CPS (48CPS NLQ);
8K Buffer, Epson compatible, etc.
Launch Offer: £299

NEW

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Launch Price: **£59**

Price includes 3 Cables

NOW WITH EXTRA FEATURES AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

If you already have the Watford Electronics DFS and wish to incorporate these new facilities then simply return your existing DFS ROM to us together with £5 remittance for an upgrade. Please pack the ROM securely and address the package to our Upgrades Dept.

WATFORD's & ACORN's SINGLE DENSITY DFS

Watford's popular and widely acclaimed DFS has now been available for five years and has gained a large following amongst serious and educational users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. (P.S. Watford's highly sophisticated DFS is fully compatible with Acorn DFS). (not Acorn's 1770 DFS)

- Complete Disc Interface Kit including DFS ROM and fitting instructions **£58**
- Acorn's 0.90 DFS Kit complete **£59**
- DFS Manual (Comprehensive) (no VAT) **£6.95**
- (P.S. Our DFS manual is the only comprehensive Manual available for the BBC micro and covers both Acorn & Watford DFSs).
- Watford's sophisticated DFS ROM only **£16**
- We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only **£12**
- DNFS ROM only **£17** ● ADFS ROM only **£25**

NEW

WATFORD's Mk II Double Density DFS INTERFACE

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our MkII DDFS board has been adapted to allow the use of Acorn ADFS as well.

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00**.

- Special introductory offer **£39.00**
- DDFS Manual (No VAT) **£6.95**
- We will exchange your existing DFS Kit for our sophisticated DDFS for only **£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

SPECIAL DISC DRIVE/DDFS OFFER

Type CLS400S



- The popular Mitsubishi 400k Single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's popular DDFS Disc Interface (allows 720k storage). Will run in both Single and Double Density modes 40/80 track Software switchable.
- A comprehensive User Friendly Manual.

A Bargain at Only **£130** (£6 carr)
(Offer valid while stocks last)

3 1/2" DISC DRIVE OFFER



These top quality 3 1/2" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc. They run directly from the BBC B/Master's own PSU.

- Single 400K Drive **£69**
- Twin 800K Drives **£126**

Mysteries of Disc Drives & DFS Revealed

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

Then The Mysteries of Disc Drives and DFS Revealed is the book for you. It explains in detail the different types of systems available, how they are installed and how to use them. Many examples are given including pre-written programs to call various functions of the DFS available only through Operating System calls. Different types of disc, 40/80 tracks etc. are all explained. This book is ideal for the beginner confused by the plethora of choice available in the marketplace.

£5.95 (Book No VAT)

DISC ALBUMS

Attractively finished in antique brown leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

£4

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3 1/2" & 5 1/4", please specify.

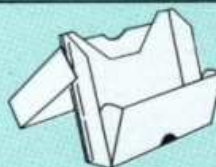
£6

ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection – Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

- M35 – holds upto 50 5 1/4" discs **£6.00**
- M85 – holds upto 95 5 1/4" discs **£8.00**
- M25* – holds upto 25 3 1/2" Discs **£5.50**
- M50 – holds 50 3 1/2" Discs **£7.50**

* Not lockable



PLASTIC LIBRARY CASES

Holds up to 10 5 1/4" Discs. Only **£2.00**

DISC PLONKER RACK

When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk.

Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. It holds up to eight 5 1/4" Discs.



Protection at Only: **£2**

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

Continued

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates capacity in single density mode. That within the brackets is the capacity in double density mode. All disc drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.

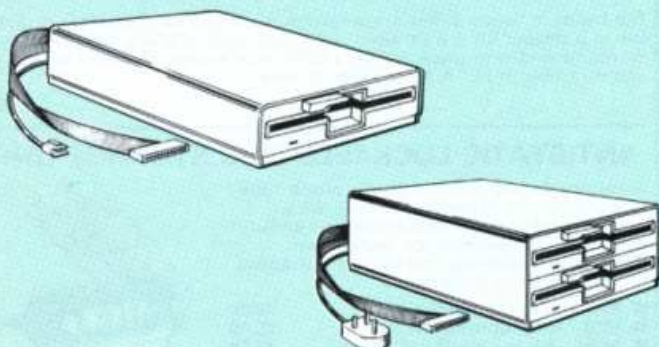
Various other "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality JVC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £5. (At Watford we anticipate your needs of tomorrow, not just today!)

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 6th page of our advert for the Plinths).

P.S. All our 5 1/4" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.



Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
200K (360K)	CLS 200 £89		CS 200 £98	
400K (720K)	CLS400S £85	CLD 400 £168	CS 400S £96	CD400 £188
800K (1.44M)		CLD 800S £167		CD 800S £186
● TWIN Disc Drive Case, complete with Power Supply & Cables £43 Securicor carriage on Disc Drives £5 to £6				

Prefix C = Cased Drive

L = Less PSU

S = Single

D = Double

Suffix S = 40-80 Switchable

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5 1/4" 400K, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5 1/4" Disc Drives to BBC Compact

Single £9 Twin £12

Special Cable to connect both 3 1/2" and 5 1/4" Disc Drives simultaneously to the BBC Compact £13

3M - DISKETTES

3M - SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

● 10 x 5 1/4" S/S D/D 40 Track Diskettes (744)	£8.00
● 10 x 5 1/4" D/S D/D 40 Track Diskettes (745)	£9.75
● 10 x 5 1/4" S/S D/D 80 Track Diskettes (746)	£12.50
● 10 x 5 1/4" D/S D/D 80 Track Diskettes (747)	£12.75
● 10 x 5 1/4" 1.6M D/S D/D High Density Discs for IBM XT and AT	£28
● 10 x 3 1/2" S/S D/D 40/80 track Discs	£13.50
● 10 x 3 1/2" D/S D/D 40/80 track Discs	£15
● 10 x 3 1/2" High Density Diskettes	£43



FREE

This extremely useful and attractive Personal Leather Organiser worth upto £50 is yours when you buy from us, 5 Boxes of any of the 3M range of Discs that we advertise above.

TOP QUALITY 3 1/2" & 5 1/4" DISKETTES

To complement the range of quality discs and disc drives that WE already sell, WE are now supplying some special offer packs of 10 high quality discs. Each Disc has a reinforced hub ring and carries a lifetime guarantee. These are supplied complete with selfstick labels and packaged in an attractive plastic library disc box. We strongly recommend these Discs.

● 10 x M3 3 1/2" D/S D/D 80 Track Discs	£13
● 10 x M4 5 1/4" S/S D/D 40 Track Discs	£6.50
● 10 x M5 5 1/4" D/S D/D 40 Track Discs	£8
● 10 x M7 5 1/4" D/S D/D 80 Track Discs	£9
● 3" Double Sided Discs	£3 each

Special BULK OFFER on 5 1/4" DISCS

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

PRICES
SLASHED

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£35	£39	£45
● With Sleeves	£38	£42	£48

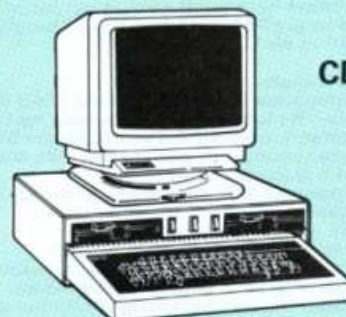
PRICES
SLASHED

WATFORD'S WINCHESTER DRIVES

- 10 Megabyte Unit with ADFS £375
 - 30 Megabyte Unit with ADFS £425
- (30 Meg Unit is supplied complete with utilities software. For full details see Page 6 of our advert)

CDP800S

CDPM800S



Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

CDP 800S for BBC Micro £192

CDPM 800S for Master £196

DP35-800 for BBC/Master £165

(For DP35-800S spec. see Page 4 of our advert)

(Securicor Carr. £7)

(The above drive units are 2 Megabytes unformatted)

NOMINATED
FOR



1987



QUEST MOUSE

The ultimate in Mouse technology, the Watford Electronics Quest Mouse must be the most powerful Mouse package yet produced for the BBC Micro. Featuring state of the art 32K ROM software the Quest Mouse package is filled with features essential to the budding artist. The Quest Mouse is a high precision, low profile and large footprint mouse. It has three large comfortable buttons and its RUBBER COATED STEEL BALL is smooth and easy to use on virtually any work surface. This also eliminates any directional bias that one encounters on the most well-known mouse for the BBC. The Quest Mouse is FULLY HARDWARE COMPATIBLE with the AMX MOUSE so that it will work with any of the AMX range of software.

The two parts of the Quest package are available separately so that existing Mouse owners can upgrade to the Watford's sophisticated Quest Paint software or replace their existing worn out mice for a minimum cost.

QUEST PAINT

The Quest Mouse software is supplied on a PALPROM unit to allow the sophisticated 32K program to be used from a single ROM socket. It is compatible with the BBC B, BBC B Plus and BBC Master Series machines.

The software is used to draw high resolution Mode 1 pictures in full colour. All menu selection and control of the drawing process is performed with the mouse so that you will hardly ever touch the keyboard.

SOFTWARE FEATURES

The software is far too powerful for us to describe it fully in such a small space. Below is a list of the various features. Please write to us for a fully descriptive leaflet.

Disk interface not required. Utilities disk has facility to create and print big screens. Colours applied can be solid, either pattern of user defined pattern. Drawing can use brush or airbrush. Brush shapes can be defined and stored. Airbrush sprays colour/pattern randomly with four jet sizes and even or center spread. Colour cycles. Colour protection to stop particular colours from being overwritten by selected drawing actions. All standard drawing facilities like: rubber, straight pencil lines, triangles, circles, ellipses, rectangles, parallelograms, polygons, etc are provided. All shapes can be solid or just a boundary line. Once a shape has been set up it can be repeated anywhere on the screen. Global colour replace in a rectangle. Powerful fill facility for areas and vertical/horizontal lines. Full cut and paste of rectangular areas with rotation and size with screens from Watford Beeb Video digitiser. Load and Save screens with colour pallet information, save brush and pattern definitions etc.

Take The Guesswork Out of Selecting a Mouse Package

With reviews like this how can you go wrong.

Popular Computing Weekly, 9-11 June '87

"What you actually get for your money is a well built, three button mouse (far superior to the AMX mouse)."

"Overall the combination of a quality mouse and decent art package gives Watford Electronics a real chance of supplanting AMX as mouse supremos."

Micro User June '87

"Quest Mouse and Quest Paint can hold their heads high in the market. . ."

A&B Computing June '87

"... Watford Electronics, a company famed for excellent hardware add ons and versatile software packages. Called Quest mouse, "this is a very special mouse driven drawing package..."

"... you will have one of the most comfortable and professionally built mice I have used in a long time. The buttons are responsive, the mouse movement is smooth and without directional bias - a pleasure to use."

"What we have here is probably the best art package there is for the BBC Micro..."

"Quest Paint is a major leap forward in BBC programming. . ."

"Quest Paint is an original piece of programming, it is friendly and well endowed with many useful facilities. I would comfortably say it is easier to draw good pictures with Quest Paint than it is with more expensive 'Professional' art packages for the Atari ST and the Commodore Amiga. A recommended buy if you are looking for the best in BBC micro based art packages".

Acorn User, September '87

"The mouse (Quest) performs well in the face of competition from AMX, Wigmore and the rest..."

"... this package represents excellent value for money. If you are interested in art then this program is for you to buy".

"Given time, I can see no reason why Quest Paint shouldn't take on the title of the definitive art package available for the BBC Micro to date".

"All in all, Quest Paint is a very professional package. It contains virtually every feature the budding artist could require".

"What makes Quest Paint so versatile is the addition of a sub-menu which allows you extensive control over each function".

"Until recently, Superart from AMS had been judged as the definitive mode 1 graphics package for the BBC micro. But now it has a serious rival in the form of Quest Paint, from Watford".

"As a measure of what is contained within Quest Paint, I would say it had all the features of Superart plus..."

"In most art packages, provision is given for drawing triangles and rectangles. Quest Mouse goes 14 better, allowing any regular polygon of upto 16 sides".

"One facility, not found on any other Art package to my knowledge, is the ability to access a digitiser from within the program". The reviewer concludes by saying, "The result is an extremely comprehensive and professional art package".

John Kilby, Head of Computer Science, Bishop Wulstan High School, Rugby, writes:

"Quest has been an excellent piece of equipment. The problem that seems to occur everyday is that at lunchtime the pupils rush to the computer room to make sure that they are first in the queue for the 'Quest' mouse".

Lt. Cln. C.G. Holton, G2 HQ 1 (BR) Corps, BFPO 39, writes:

"As ever your service is superb and the Quest Mouse proves every bit as good as the adverts claim".

Beeblet User Group, New Zealand Oct '87:

"One of its nicer features is that the top menu is done in Mode 0, the drawing itself is in Mode 1. Thus on screen together are two different Modes. A neat way around an old problem".

"PAN is used when a larger than one screen size image is required. The mind boggles at an A3 size drawing".

"I like it partly because of the mouse itself which is smooth and easy to handle but mainly I suppose because of the features I longed for and previously never got. Its easy to use with almost everything at your fingertips from the mouse. The software is simple where needed and complex where complexity is required".

ConQuest

Watford's Quest package is an extremely powerful and flexible drawing package, with very wide and unusual features. However, since its launch various suggestions for even more advanced & powerful facilities were received from the Quest users. ConQuest allows you these more advanced facilities, like, distortion of a cutout to any shape and a full font designer. If you also have a GXR ROM in your machine or you are using a BBC Master then ConQuest will take advantage of this to give ellipses at any angle, sectors and arcs, etc. Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

Some of the features are:

- Pick filenames off the screen for loading and saving.
- Rotate a cutout to any angle and Distort it to any four sided shape.
- Has Built in Font editor.
- Default brushes and patterns on startup.
- 16 x 16 font available on start up.
- Ability to reset patterns, fonts and brushes to default at any time.
- ROM based enhanced Epson and compatible printer dump.
- ROM based enhanced extended picture routine.
- Ability to create and abort extended pictures.
- Improved disk access speed for extended pictures.
- User definable sideways RAM driver for incompatible sideways RAM systems.
- Ellipses at any angle on Master 128 (or B with GXR ROM).

QUEST MOUSE & QUEST PAINT	£59
QUEST MOUSE, QUEST PAINT, AMX	
PAGEMAKER & PAGEFONT	£85
QUEST MOUSE ONLY	£29
QUEST PAINT SOFTWARE	£32
QUEST FONT DISC	£12
ConQuest 32K ROM Package	£29
QUEST MAT	£3
Part-exchange your old Mouse for a New QUEST MOUSE for only	£23
GXR ROM for BBC Micro	£22

N.B.

1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.
2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

MARK II LIGHT PEN

Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted.

Price Only £21

(Price includes FREE software Disc and Operating Manual)

RB2 Marconi Tracker Ball

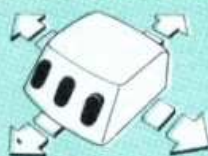
RB2 (AMX/Quest compatible)	£52
RB2 including Quest Paint	£78

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Software Pack for Compact	£40
Admin Xtra Disc Utility	£13
Walt Disney Disc Utility	£13
Fonts N Graphics Disc Utility	£13

Continued

THE NEW Mk III AMX MOUSE



ONLY: £59 Inc. Super Art package
(carr £1.50)
(Please specify for BBC, Master or Compact)

FREE our popular Colour Art software pack worth £15 with every AMX Mouse package purchased from us.

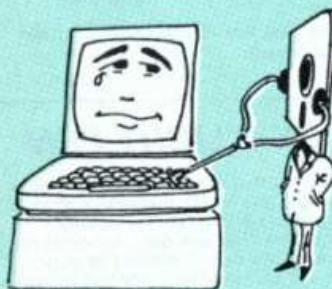
MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX UTILITY Package	£11
AMX SUPERART Package	£34
AMX STOP PRESS - A Desktop publishing software. Works with Keyboard, Joystick or a mouse	£32

We are giving away absolutely FREE, our PAGE-FONT disc with every purchase of STOP PRESS from us.

PAGE-FONTS - Over 20 Fonts for use with AMX Pagemaker **£12**

AMX DESIGN (ROM)	£55
AMX 3D ZICON Disc	£19
AMX XAM Educational	£15
AMX EXTRA EXTRA	£15
AMX MAX A gem of desktop (ROM)	£15

DIAGNOSTICS DISC



The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult. At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.

The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb: RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.

This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

BEEB VIDEO DIGITISER



Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package is designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROMs to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £3)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual
(BBC B+ and Master compatible, except Master with Econet)

Magazine Maker

(As seen on TV)

A combination of the Pagemaker and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within Pagemaker to illustrate magazines or newsletters - in fact anything that needs to be created on A4 size paper.

With Pagemaker's many features, a variety of pictures can be composed - the only limit being the imagination.

Pictures can be doctored using Pagemaker's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out. The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package £135.00 (carr. £3)

PLINTHS FOR BBC MICRO, MASTER & PRINTERS



Protect your computer from the weight and heat of your monitor. The BBC micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and monitor, whilst the double height version provides enough room for our stacked or side-by-side dual disc drives or TORCH Disc pack, to be placed in the centre section. If you use our stacked drives, the remaining space can be used for further peripherals e.g. Speech Synthesizer, EPROM programmer or simply stationery. The computer slides neatly in to the lower section allowing easy access to remove the lid. The printer plinth is equally sturdy but without the cooling slots. It

allows for access to the paper from the front as well as from the rear, (a facility not often thought of in similar products) if the paper is located beneath the plinth. This is a very convenient way to work especially if your work area is not deep enough to take the printer and paper separately.

SINGLE BBC PLINTH	£11 (carr. £1.50)
DOUBLE BBC PLINTH	£19 (carr. £3.00)
PRINTER PLINTH	£10 (carr. £1.50)
SINGLE MASTER PLINTH	£14 (carr. £1.50)
DOUBLE MASTER PLINTH	£24 (carr. £3.00)

COPY HOLDERS



How often have you been about to type hand written notes into your computer when you find that there's nowhere to rest the paper or that your notes are resting at the wrong angle to read the type? Whether the notes be your latest program or the draft of a new trilogy, the new Manuscript Holders from Watford are superb for holding your paper at the ideal height and angle to allow you read and type in ease and comfort.

Available in 2 versions, desk resting and shelf clamping versions, these two units hold your paper firmly by means of a plastic retaining ruler and a clip grip. Both units are full A4 size.

Amazing value at only

Desk Top £10 (carr. £2)

Angle poise £14 (carr. £3)



ARIES CORNER

The Aries B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro - no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

● Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£80** (carr. £2)



**CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383**

Aries B-12 Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries-B20 and the Aries-B32.

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable "mother board" which carries the extension ROM sockets and a small "base board" on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

Price: Aries B-12 **£40**
Aries B-12C **£5**

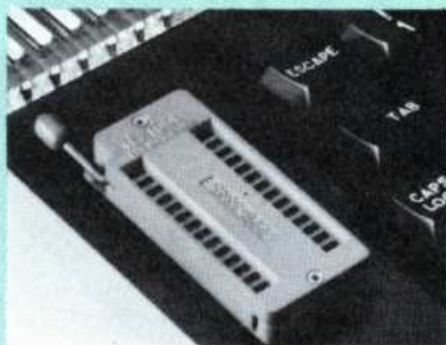
ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

All prices in this advert are
exclusive of VAT.

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

● Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.

● The low profile of the socket allows unrestricted access to the Keyboard.

● All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.

● This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)

● BBC, B+ and Master compatible.

ONLY £16 (carr £2)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

● Complete System **£11**

● Spare Cartridges **£2.50**

● Spare Rack **£1.50**

ROM Cartridges for the BBC Master
Twin **£7.50**; Quad **£11**

16K Sideways RAM Modules

Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.

Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- May be fitted in systems even with a ROM board.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£24** (carr £2)

Optional extras

READ and WRITE protect Switches **£2** each
Battery for Battery Backup **£3**

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's Independent review, the writer concludes, "The board has been well laid out. Its position is much better than others - not over the HOT RAM chips and further away from the disc controller area", "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- No soldering required.
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish" allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: **Only £32**
Battery backup fitted **£36**
Battery Backup only **£3**
(carriage £2)

● Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM images and the facility to use Sideways RAM as Printer Buffer.

Only: **£8**

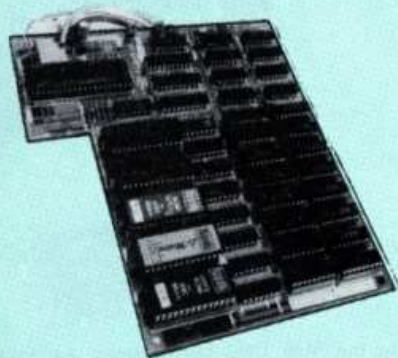
USER PORT SPLITTER UNIT



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Continued

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPILL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

- ROM/RAM card with 32k dynamic RAM£45
- ROM/RAM card with 64k dynamic RAM£59
- ROM/RAM card with a massive 128k dynamic RAM£89

(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit£9
- 16k Dynamic RAM for Upgrade£9.20
- Battery backup£3
- Read and Write protect switches£2 each
- Complete ROM-RAM board£106
- All options installed£106

P.S.

Is your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford ROM/RAM Board and pay £5 less

Le Modem



The MODEM from Watford

At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 & 75/1200 UK and BELL (USA) are all supported.

The features that make Le MODEM such good value are:

- A complete communications terminal that transforms your BBC Micro into a very powerful World-wide data transfer system.
- Auto Dials, Auto answers, and is completely controlled by your micro. There are no external controls!
- Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY 88 and more.
- Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.
- Supplied with a comprehensive telecomms package in a 16k sideways ROM which includes a FULL PRESTEL terminal allowing TELE-SOFTWARE to be downloaded.
- A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!
- FULLY controlled by simple **COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!
- Connects to the 1MHz bus. A *AUDIO ON-OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.
- Completely self contained with internal mains power supply. (Even a free mains plug is fitted!)
- A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.
- Packaged in such a way that you need nothing else except a BBC Micro to communicate with computers all over the world.
- FREE Registration to MicroLink.

SPECIAL OFFER

Price: **£88**
(carr £3)



(Price includes, Le Modem, Software ROM, Cables & Comprehensive Manual)
(Write in for further details)

Minerva Systems Software

- System Delta with Card Index£55
- System Programmers Ref. Guide£19
- System Gamma£43
- System Gamma Prog. Ref. Guide£19
- System Mailshot£17
- System Reporter£17
- System Inter/View Link£17
- System Sales Ledger£39
- System Purchase Ledger£39
- System Nominal Ledger£48
- System Stock Management£39
- Order Processing/Invoicing£39

APOLLO



The NEW Modem from Watford

Following numerous requests from you, our discerning customers for an APPROVED, Low Cost & High Performance modem with Auto Dial & Auto Answer facilities as standard) we bring you the versatile APOLLO Modem. Just compare the features and look at the price (which incidentally includes the cost of the Software, manual and BBC connecting cable). We are sure you will agree that Watford Electronics in their traditional way are giving you a super 'value for money' deal.

Just look at these features:

- V21 for Bulletin boards, Microlink, Telecom Gold, etc.
- V23 for Prestel, Home Banking, and other Viewdata services.
- Reverse V23 allows User run Viewdata service.
- 1200-1200 half duplex for communications.
- XMODEM, HEX and ASCII file transmission.
- Auto Dial of given 'phone number.
- Auto Answer for User's Bulletin Board.
- 80 column terminal with split screen facility.
- Prestel text screen dump.
- Fully BABT approved.
- FREE Registration to MicroLink.
- £6.50 off annual Membership to Micronet, Prestel and Telecom Gold.

The Apollo is attractively finished in matt black. It opens the doors to world communication to both, the Hobbyist and the Professionals alike. With baud rates varying from 300/300 Originate and Answer, 1200/75 and 75/1200 full duplex and 1200/1200 half duplex, virtually all the popular tele-services can be accessed. A comprehensive Comms ROM oversees the use of the APOLLO, providing simple commands for all the software controlled facilities. APOLLO is an ideal modem for both the first time buyer and the seasoned user. Join the Telecommunications Revolution - Buy a Watford APOLLO!

Only: **£88** (Carr £3)

Price includes, the Modem, Comm Software Cables & Operating Manual.
(Write in for full specification)

VOLTMACE JOYSTICKS

- Delta 3B Single Joystick£12
- Delta 3B Twin Joysticks£17
- Delta 3C Joystick for Compact£10
- Delta 14B Single Joystick£12
- Delta 14B/1 Adaptor Module£12
- Transfer Software Disc-Tape£7

ATTACHE CARRYING CASE

For the BBC Micro. Attractively finished in antique brown leatherette. Lockable.

Only **£10** (£2 carr.)

Versatile BEEB SPEECH SYNTHESISER Unit



The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£46
CARETAKER Basic Utility	£23
DISC DOCTOR	£28
Graphics ROM	£29
TERMI	£25
COMMUNICATOR	£49
SPEECH ROM	£24
Printmaster	£25

Wordwise

£23

Wordwise plus

£40

We are giving away absolutely **FREE**, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only £24

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC: £5

SPELL MASTER £42

Inter SHEET ONLY £37

INTER-CHART

ONLY: £25

Inter-WORD

£36

MEGA-3 ROM

Interword, Intersheet & Interchart – 3 in one ROM

£76

INTERBASE £49

All Prices Exclusive of VAT

VIEW

VIEW WORDPROCESSOR 2.1 £35

VIEW 3.0 ROM £48

VIEW PROFESSIONAL £79

HI-VIEW £36
(for use with 6502 2nd Processor)

VIEW Printer Driver Generator £9
(Please specify Disc or Cassette)

VIEWSHEET (Acornsoft) £36

VIEWSTORE £36

VIEWSPELL with 80 track disc £29

VIEWPLOT Disc £20
(Please specify for Master 128 or Compact)

VIEW-INDEX £12

OVERVIEW Packs 1 & 2 for the Master £72

Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc) £8
Juki & Brother HR15 (Disc) £8
Silver Reed Printers (Disc) £8

ADVANCE COMPUTER PRODUCTS' ROMS

Adv. Disc Toolkit £29
Adv 1770 DFS for Mast/Compact £29
Adv 1770 DFS for BBC/BBC+ £29
Adv Disc Investigator £24
Adv. Control Panel £29

MINI OFFICE II

DISC Version for BBC B & B+ £14.00
DISC Version for BBC Master £16.50
ROM Version £43.00

(When ordering please specify for which Micro & 40 or 80 track Disc).

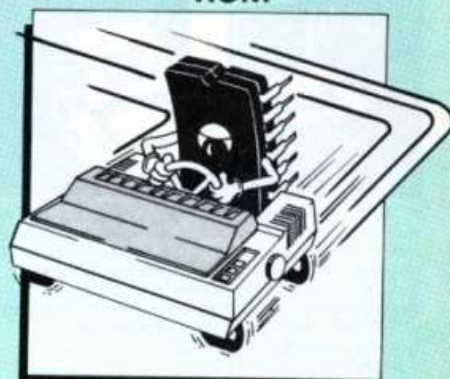
REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£15 (40 or 80 track)

Acorn's Speech Synthesiser
package, complete
Special Offer £18

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, LX, JX80 range, Hi80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33

EPSON NLQ ROM for the BBC Micro



Harness the full potential of your Epson RX or FX printer. The NLQ ROM makes Epson printers produce Near Letter Quality output with optional proportional spacing, enlarged and underlined. Accessed by simple * commands from Basic, Wordwise and View (with driver) or almost any other language.

(Send an SAE for sample printout)

Only: £25

VIEW PRINTER DRIVER for NLQ ROM

£7

Continued

DUMPOUT 3



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics. Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.

Facilities:

- Vertical and horizontal scaling in all graphics modes and mode 7
- Rotation of image by 90, 180 or 270 degrees
- Left hand margin setting
- Screen dump window setting
- Colours appear as grey scale
- Two tone fast dump
- Colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered and User Port triggered dumps

The Micro User Feb. 1985.

"Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC Micro... it must represent excellent value for money and surely cannot be beaten."

For use with the following printers:

GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Panasonic KX1081/82, Mannesman Tally and compatibles.

Only: £25

BBC SOFTWARE'S Popular Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs **£11.25**
- Maths with a Story 2 (Disc) 4 further maths programs **£11.25**
- Picture Craft (Disc) 6 - 14 age group. Pack consists of flexible geometrical design & colouring programs **£17**
- WAVES: Science Topics (Disc) CSC O Level Physics program. **£14.95**
- RELATIONSHIP: Science (Disc) O Level Biology program. **£20.00**
- BONDING: Science (Disc) O Level Chemistry program. **£20.00**
- ELECTROMAGNETIC SPECTRUM (8 Discs) O Level program. **£20.00**
- ELECTRONICS IN ACTION (Disc) O Level program **£19.95**
- NEWTON & THE SPACE SHUTTLE (Disc) O Level program. **£20**
- ECOLOGY (Disc) O Level program. **£20**
- POLYMERS (Disc) O Level program. **£20**
- Classification & Periodic Table O Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. **£20**
- FOOD & POPULATION (Disc) O Level program. **£20**
- MICROTكنولوجيا (Cassette) O Level program. **£11.25**
- A VOUS LA FRANCE (2 Cassettes) A French language home study aid. **£21.70**
- DEUTSCH DIREKT! (Disc & Audio Cassette) **£19.95**
- Modem Master (Disc) **£11.25**
- ADVANCED TELETXT SYSTEM **£8.65**
- PERIOD TABLE SOFTWARE **£20**
- Astronomy - Primary (Disc) **£12**
- Computers at Work - Primary **£17.35**
- Introducing Geography - Primary **£17**
- Introducing Geography 11-17yrs **£17.50**
- Electric Fields 6-14 years **£11.25**
- BlackQueen Contract Bridge **£13**
- Espana Viva - 3 Discs **£19.95**
- A Vous La France Disc **£21.50**

THE NLQ DESIGNER

(The First & still the Best)

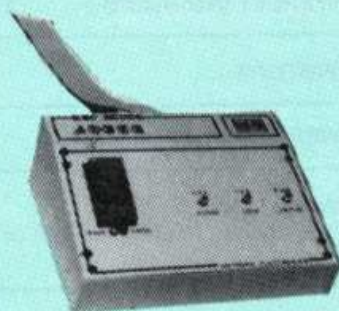
Supplied with over 25 Different fonts

A massively useful utility for users of the Taxan/Kaga KP810/910 or the Canon PW1080. This program allows you to define NLQ character sets to download into the printer's memory. Full on screen editing of the font. Requires 6264 RAM chip to be fitted in the printer.

Supplied with disc containing over 25 example fonts. (Please specify 40 or 80 track when ordering.) Fonts are: Italic, Courier, Courier Italic, Script, Copper Plate, Shadow, Bold, Double Print and Gothic etc. (P.S. This ROM is not suitable for Epson printers.)

- NLQ Designer ROM, FONT Disc and Manual **£25**
- (Write in for further details on all above ROMS)

ADDER



The only low cost EPROM Programmer for the BBC Micro that will program both the standard 21V and the new 12V5, 27128 EPROMS. Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.

The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.

The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.

Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

£75 (£3 Carr)

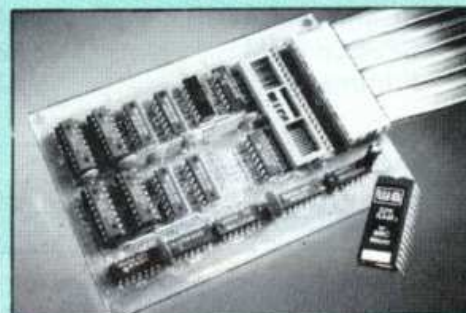
TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- ERASER BG - Standard version erases up to 16 chips. **£28 (carr £2)**
- ERASER GT - Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30 (carr £2)**
- Spare UV tubes. **£9**

32K

SHADOW RAM- Printer Buffer Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer - type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free - 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.

- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15, 21, 138, 145, ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Only £59 (carr £2)

(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32K SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89 (carr £2)**

BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£4.95
15 Hr Wordprocessing BBC/WW & WW+	£4.95
30 Hour BASIC (BBC Micro)	£9.95
40 Best machine Code Routines	£7.95
50 Programs in BBC BASIC	£6.95
6502 Assembly Language Program	£19.95
6502 Application	£13.95
6502 Assembly Lang. Subroutines	£19.95
6502 Development Package	£7.50
6502 Reference Guide	£10.95
6800 Assembly Language	£15.95
68000 Assembly Language Prog.	£19.95
68000 Machine Code Programming	£13.00
68000 Microprocessor Handbook	£14.95
68000 Programming the	£22.95
68000 User Guide	£8.95
6809, Programming the	£18.95
6809 Machine Code Programming	£7.95
8086/8088 Assembly Language Prog.	£11.95
8086/8088 Programming the	£17.95
Advanced Disc User Guide	£16.95
Advanced Prog. Guide to BBC	£9.95
Adv. Sideways RAM User Guide	£9.95
Advanced User Guide for BBC	£10.95
Advanced Graphics with BBC	£10.50
Assembly Language Programming on BBC Micro	£11.50
Adventure into BBC BASIC	£6.95
Amiga Hardware Ref Manual	£23.70
Applied Assembly Lang. for BBC	£9.95
ARM Assem. Lang. Programming	£12.95
Art of Microcomputer Graphics	£15.95
Assembly Lang. within BBC	£11.95
Basic ROM User Guide	£11.95
BBC B Compendium	£5.95
BBC Forth	£7.50
BBC Micro & Small Business	£5.75
BBC Micro & the small Business	£5.75
BBC Micro Advance Programming	£8.95
BBC Micro Basic Sound & Graphics	£7.95
BBC Micro Programming Tips	£8.95
BBC Micro ROM Book	£10.95
BBC Master 128 for High Flyer	£10.95
BBC Micro Disc Companion	£8.95
BCPL User Guide	£14
BCPL The Language & its Compiler	£7.95
C Big Red Book of	£7.50
C for Beginners	£10.95
'C' Introducing	£9.95
C for Programmers	£9.95
C Programming Lang.	£23.95
COMAL - Introduction to	£9.50
Complete FORTH	£6.95
Computer Graphics & CAD fundamentals	£9.95
CP-M Bible	£16.50
CP-M Handbook with MPM	£9.95
CP-M Plus Handbook	£13.95
CP-M Soul of	£16.50
CP-M The software BUS	£8.95
DOS Instant Reference for Versions thru 3.3	£10.95
DOS, Mastering for Versions upto 3.3	£19.95
Disc Drive Projects for Micros	£5.45
Disc Operating Systems	£14.95
DISC FILING SYSTEM (DFS)	
Operating Manual for BBC	£6.95
DBASE Programming Language	£14.95
dBase III Plus	£12.95
dBASE III Plus, Quick Ref. Guide	£4.95
dBase III Tips & Tricks	£14.25
Disc Programming Techniques	£9.95
Exploring FORTH	£6.95
File Handling on BBC Micro	£7.95
FORTH - Acorn	£7.50
FORTH - Advanced	£9.95
FORTH - A Text Reference	£19.10
FORTH - Introduction to	£8.95
FORTH on the BBC Micro	£9.95
FORTH - Starting	£19.10
Functional Forth for the BBC Micro	£5.95
Guide to BBC ROMs	£9.95
Graphics for Children	£6.95
Hackers Handbook - New	£6.95
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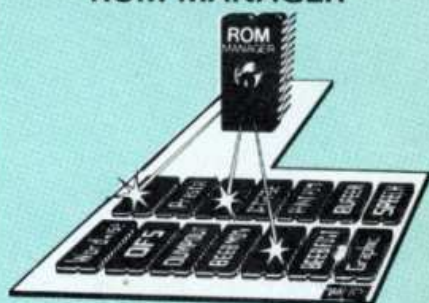


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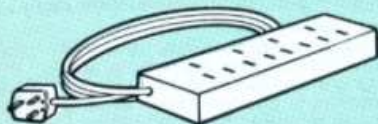
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A relatively cheap and substantial upgrade in computing power is now available to all BBC micro users. If you own a Master 128 you can now convert it into a 512 for around £200.

If you have a Model B then the 80186 co-processor can be added in the shape of the Watford Electronics Co-Pro Adaptor. Acorn also supply a co-processor, without a programming language but with mouse and bundled software from the Gem collection for painting and word processing. This package has been pitched squarely at the business user in light of its capability to run a significant amount of software designed for the IBM PC and compatibles (an aspect well covered by Gordon Taylor here in A&B).

I realised some time ago how much extra computing power was on offer at low cost but was not tempted to buy as I found the business type software that I use on the BBC (*Interword*, *Intersheet*, *Deltabase*, *Unistat* etc) to be quite adequate for my needs. I only purchased the co-processor when I had a need to develop IBM compatible software and discovered that Borland's *Turbo Pascal* was 99% (100% if you exclude the sound commands). After several months of use I can report that this language is excellent value for money and provides a programming environment that no BBC based language begins to compete with.

My experiences are based on *Turbo Pascal* version 3, though I understand that version 4 is now available and considerably enhanced. I have not had the opportunity to test version 4 on the Master 512 so I cannot vouch for its compatibility. Owners of *Turbo Pascal* can also purchase from Borland a number of additional software packages, mostly in the form of procedure libraries. These include a *Graphix Toolbox* (briefly discussed below), a database package and a games system including powerful Chess and Bridge programs.

Turbo Pascal 3

One of the things which has annoyed me about Acornsoft's policy on BBC based languages is that they provide only technical reference manuals with no attempt to explain the nature of the languages. Not so Borland. In spite of the remarkably low cost, you get a comprehensive, professionally presented, 400 page book describing the language as well as its full implementation. However, it does not provide a tutorial on programming, so the inexperienced may require one of the many texts on the market. Mind you, anyone experienced in BBC BASIC and already utilising the structured programming approach which that language permits should pick up Pascal programming fairly easily.

Pascal provides a range of control and data structures which greatly exceeds the power of even the best of structured

BASICs. Among the extensions which BBC BASIC programmers will notice are extended control procedures (while loops, case statements etc), extra data types (eg scalars, sets, booleans, pointers and records) and the ability to define your own data types. Also, arguments to procedures may be passed by reference as well as value, which means that arrays can be passed as arguments and that procedures can return multiple values in addition to single value functions.

Turbo implementation meets the international Pascal standard with some extensions. Some of these extend general purpose programming functions such as the dynamic strings and structured constants (allowing, for example, the contents of arrays to be initialised when defined) whereas others concern machine specific functions relating to file handling, graphics and so on. One of the delights of the package, as we shall see, is that the latter are all effective on the Master 512 via Acorn's emulation of the IBM environment.

In looking at attempts to produce the compiled language C on the BBC micro (A&B February 1988) I was frustrated by the very slow disc based compilation process and the fact that the "compiled code" was actually interpreted in a virtual machine with little speed gain over BBC BASIC. By contrast *Turbo Pascal* is everything that a compiled language should be — easy to use, fast and producing stand-alone machine code.

On entering the system, *Turbo* provides 64K of memory which is **permanently**

reserved for editing your source program. The text editor is easy to use and controls can be reconfigured if you don't like the default WordStar conventions. A program can be edited and then compiled into memory, test run and edited again as often as you like without any disc access being required at all. Moreover, this compilation process is extremely fast so that several hundred lines of program code will be compiled in a few seconds. The error diagnostics are also excellent for both compile and run-time errors.

Despite the presence of DOS plus, the *Turbo* editor and compiler and the 64K of text space, the memory remaining for use by your own software for the compiled code and data space is a staggering (by BBC standards) 300K. You're not limited to 64K of source text program either. Additional files can be included from disc at the point indicated by a compiler directive in your main text. A basic concept of *Turbo Pascal* is that procedure libraries supplied by Borland or developed by the user should be included in this way.

The penalty for this system is in speed, since it means that the whole of the procedure library is recompiled from disc every time you edit the program in memory and wish to re-test it (I believe that version 4 has a more efficient linker system). However, the speed is still relatively fast and the capacity quite amazing. For example, one of the demonstration programs provided with the *Graphix Toolbox* package compiles over 5000 (yes Five Thousand!) lines of program code into memory before running. Despite the fact that the great bulk of this code is read from disc, it still only takes little over a minute to compile!

A big factor in the speed question is how much access to the screen the program makes. Screen handling is slower than in BBC BASIC because the IBM calls must be intercepted by Acorn's emulation and translated into terms that the BBC VDU drivers can understand. A second factor concerns the data type that the program is manipulating. *Turbo Pascal* handles integers at incredible speeds — around 150 to 200 times faster than BBC BASIC from the tests I have made. However, integers are only two bytes long in *Turbo Pascal* as opposed to the four bytes used by BBC BASIC. As I noted in my comparative review of BBC C's precision of number handling trades off substantially against speed. In fact, the speed gain in processing real numbers which are handled with similar precision in the two languages is considerably more modest.

To get some idea of speed comparison, I wrote a couple of *Turbo Pascal* versions of the programs used for speed test comparisons in my C article. The BBC BASIC program to find and print on screen all the

prime numbers between 1 and 1000 took 68.7 seconds to execute. The exact equivalent *Turbo Pascal* program took 4.6 seconds to run. However, this time was considerably influenced by the requirement to print the 169 primes on the screen as they were found. With screen printing removed the program ran in a staggeringly fast 0.42 of a second. The real number test that I used in the C article involved converting degrees to radians 3600 times, printing every 100th answer on the screen. BBC BASIC achieved this in 27.0 seconds and *Turbo Pascal* in 10.32 seconds, or in 4.6 seconds with printing commands removed. The relatively fast performance of BBC BASIC here may be a little misleading compared with other real number tasks since this involves intensive use of trigonometric functions which are accessed as machine code routines from the BASIC ROM.

The above comparisons are between a compiled language on a fast processor and an interpreted language on a much slower processor, so it is not surprising that *Turbo Pascal* wins handsdown. It's relevant to note how the speed gains vary from the merely useful to the astronomical depending upon how much you access the screen and the extent to which integer or real number processing is involved. Taking the environment as a whole, however, the development of computationally intensive programs for such things as mathematical modelling, scientific simulations or statistical analysis would benefit enormously from transfer to the system I am describing. You could tackle tasks that would have required mini if not main-frame computing power in the not too distant past.

PC Compatibility

An important consideration for some will be the degree of access provided to the machine. Well, sound facilities are not provided in the Acorn emulation so the relevant commands in *Turbo Pascal* are useless but harmless - I have yet to discover anything in the language which crashes the system. You can access the bell character (equivalent VDU 7) by Write(Δ G) but that's it so far as sound goes. Access to the system time clocks is supported, so that for example the Delay(c) command to cause a wait of c centi-seconds works correctly. *Turbo Pascal* does not provide the equivalent of BBC BASIC's TIME command for reading the clock for timing purposes, but I have discovered that it is possible to implement this.

The function has to be of type real rather than integer because two bytes is insufficient to store the number computed. I adapted this function from that written by a colleague who was using *Turbo Pascal* on the IBM AT machine. I was rather surprised that it worked since it requires use of the MS-DOS command which Borland have supplied to allow access to the IBM operating system via its registers. Full marks to Acorn's emulation once again.

The most important machine specific functions are, of course, those concerned with graphics. I have tested not only the

standard graphics commands provided in the basic package, but all the extensions provided in the *Graphix Toolbox* and found them 100% compatible. However, I cannot in all honesty say that I have enjoyed my experiences in programming graphics with the system for two reasons:

- Due to the slow, emulated screen handling picture quality when animating is often poor, and...
- The standard IBM PC graphics which are implemented by the emulation are considerably inferior to those available in BBC BASIC.



The basic screen of the IBM PC has happily the same horizontal resolution of 640 pixels as the BBC, but a smaller vertical resolution of 200 rather than 256. Hence, the standard emulation for 80 by 25 text is achieved by a Mode 0 screen of reduced height. For graphics programming one has effectively two choices of screen mode: Hi-Res which uses this reduced Mode 0 screen or GraphColorMode which is a cut down Mode 1 providing 320 by 200 resolution in four colours and with 40 column text. The co-ordinate system differs from BBC conventions in two ways:

- The 0,0 point is in the top left rather than bottom left corner and...
- References are made to pixel numbers not to a theoretical co-ordinate system. Hence, horizontal co-ordinate references must be rescaled to fit the resolution of the mode used.

The use of colour is far less flexible than in BBC BASIC. You essentially have a choice of only two palettes providing either red, green, white and black or else magenta, cyan, white and black. There is no equivalent of VDU 19 for logical colour switching. Only very restricted versions of the familiar GCOL and PLOT variations are allowed. For example, there is no facility for exclusive-or plotting as such (GCOL 3) though a rather cumbersome logical colour table does allow colour printing to be influenced by the colour already present so that an object can appear to move behind another. The most frustrating limitation I discovered was that you cannot create user defined characters or print text at the graphics cursor (VDU 5). This makes animation very difficult and slow as you effectively have to repeatedly draw polygons. Although flood fills are provided, they are not supported with the colour table and hence are effectively useless in the

drawing of animated objects.

In short, the graphics are much inferior to those designed by Acorn in the original BBC, let alone with all the extra goodies provided by GFX ROM standardised in the Master 128. These limitations are partly in the *Turbo Pascal* implementation (I believe improved in version 4) but largely due to the design of the IBM PC which is being emulated. All that is provided without extensions is a choice of screen mode and colours, basic line drawing and the use of windows which 'clip' drawing outside of their co-ordinates. Extended graphics are available in version 3 by use of a library file and these include arc and circle plotting, the logical colour table and a turtle graphics system.

If you purchase the *Graphix Toolbox* at additional cost then you get a large set of routines in the form of procedures libraries that can be included in your programs. These routines make use of the large memory and fast processing speeds to provide facilities that you could not implement on a BBC micro. For example, there is a powerful window management system provided which allows you to create, remove and animate windows and stack their contents in memory for later retrieval. A strong feature of the window system is that co-ordinate can be defined relative to the size of window so that drawing are automatically rescaled when the size is changed. There is also a powerful set of routines for handling polygons (stored as 2 by n arrays of co-ordinates) such that rotation, translation and size changes can be computed automatically.

The Toolbox also includes powerful routines for plotting histograms, pie-charts and line graphs. The latter are facilitated by inclusion of 'splining' algorithms which compute interpolated points to provide smooth curve plots from limited data. Impressive though these routines are, they do not overcome the basic limitations in terms of colour use, animation and sluggish screen response that I have identified.

Conclusions

I have written this review with particular thought to the BBC BASIC programmer who may wish to upgrade his or her programming environment and is unsure of the most cost-effective way to achieve this. One possibility that anyone in this position will have considered is trading in their Beeb for a more powerful machine, such as an Archimedes or an IBM compatible. If your machine is relatively new or if you have a substantial software or database commitment to it, you may hesitate to take this option. In this case, the 80186 upgrade with Borland's *Turbo Pascal* is well worth considering.

Factfile

Turbo Pascal 4.0 costs £59.95 + VAT, *Developers Library* (including all Toolboxes) costs £235 + VAT available from Borland International UK Ltd, 8 Pavillions, Ruscombe Business Park, Twyford, Berkshire RG10 9NN ☎ (0734) 320022.

Welcome!

Yes, welcome to a rather strange Arcade. Next to my trusty old Beeb I have precisely one new game to look at – not that there's any cause for concern, some new games are just around the corner!

So what's happening? It seems, sad to say, that this is the month that all those brave promises and exultant words dissolve into sand between the fingers. In short: there are no new games (tell me when this is all over, sob – Ed.).

Now, for a freelancer who makes *loads* of money each and every month reviewing the latest games for you (and even the games that programmers haven't even thought of yet!), this could be a time to panic. However, we're more casual about things here. My theory is simple – start typing and see what happens.

Join me then on a voyage of discovery into the empty mind of a games reviewer, still eager to earn a meagre crust from the ever-generous editor!

The month we've all been dreading – the new games dry up!

THE ARCADE

Game of the month (by default!)

Spycat Superior Software/Acornsoft
Model B/Master/Compact/Electron
Tape/disc £9.95/£11.95/£14.95

Graphics/sound 8 Playability 8 Originality 7
Options sound/pause Value for money 8
Lifespan 8 Overall 8

A new game from Superior is usually something to relish and this is no exception. Slightly unusual, yes; unlike the normal BBC game, certainly; game of the month, er... of course.

Relying rather too much on schoolboy level puns, this is quite a reasonable arcade game – though I think that in a normal month of releases it would be seen as rather shallow.

Trying to avoid the 'jokes' the plot is simple: you are both a spy and a cat who has to find three valuable documents in and around Downing Street and other government/official buildings.

It's certainly playable – the graphics are satisfyingly large and the adventure elements of the game should get you hunched over the keyboard for some time. However, and it is a big however, I find the whole cuteness of the

concept rather off-putting. Whether you think Peter Wright and the *Spycatcher* saga as symptomatic of government hypocrisy or individual creed, it is still rather odd to base a computer game's appeal on the facile re-naming of characters – Peter Correct, Margo Thatch, etc. To me, it rather demeans a serious constitutional matter.

Okay, lecture over. Certainly the game stands up on its own without all this gloss – the gameplay is fun, the graphics excellent and the discovery of the documents amongst the detailed screens should please many of you. In a sense it doesn't play like a Beeb game at all – there's something of the C64 hit *Monty Mole* about this at times.

Using icon displays at the top of the screen, you are able to detect the nature of objects discovered and picked up. And, even after finding all the documents, you still need to photocopy them, track down a passport, typewriter and air ticket and emigrate to Greenland via Heathrow to write your memoirs.

However, I don't think that will be too much of a problem for the experienced amongst you. I've already received a complete solution! The game's value will, I think depend more on your pleasure with the

SPYCAT
An Interactive Exposé of MI4½.

GAME DESIGN, CODE, GRAPHICS AND SOUND

BY

Dylan

SUPERIOR SOFTWARE

ACORN SOFTWARE

graphics and general feel than the (at times) spurious adventure elements.

Still it's nice to see Superior doing something a bit different and it certainly acts as a good curtain raiser for their projected blitz of ace goodies over the summer period.

Preview Part One

I'm gong to have to tread a little carefully here – the last time I talked about an exclusive preview from Audiogenic (*Guildmaster*, if you recall), I was surprised to see it appearing on Superior's upcoming list instead (as *Pipeline*).

Well, I just don't care who releases a superb new game by Sam Inglis, name of *Shark*. In outline, I suppose you'd have to point hard at the influence of *Stryker's Run* – lone soldier, right to left scrolling, lots of baddies, helicopters with bombs, etc etc.

However, it has that vital ingredient – compulsive gameplay. In fact, it's a real struggle to stop for a few short minutes to write these words for you – after all, my score stands at 247,580 and I'm nearly through level two!

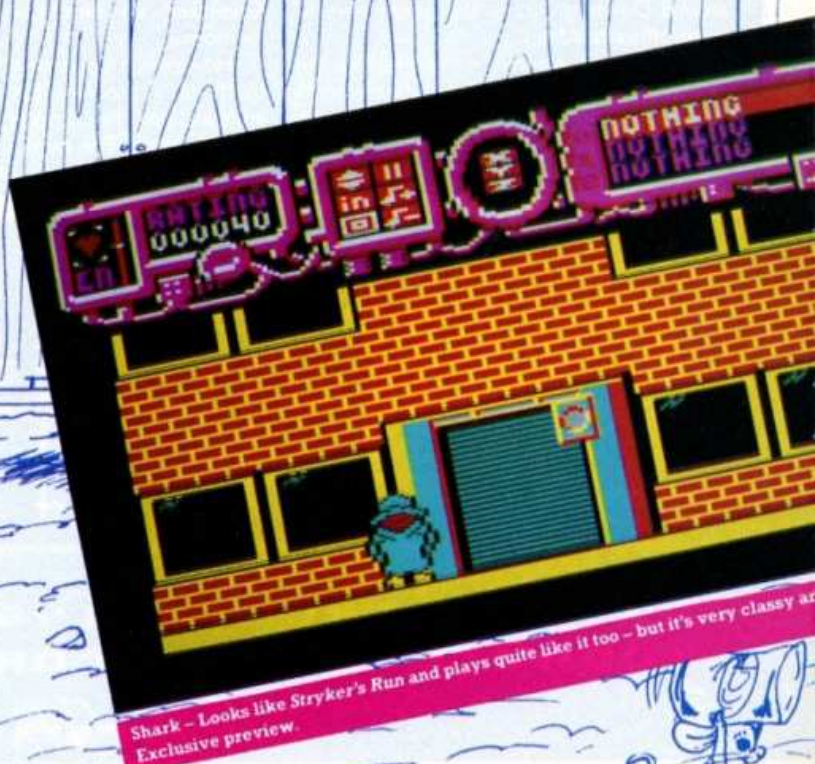


ARCADE

alley



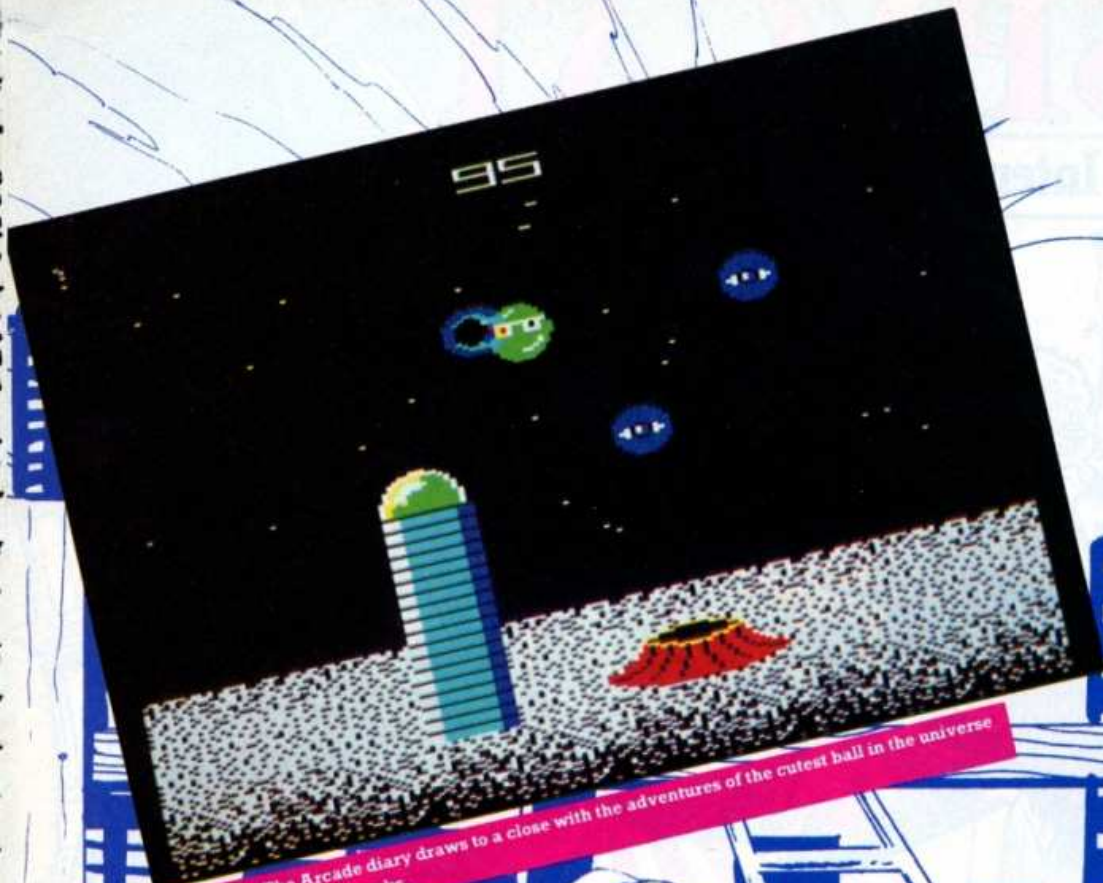
Spycat - Chat to the PM, find the documents, fly to Greenland and still have time to enjoy your Kit-e-Kat for tea.



Shark - Looks like Stryker's Run and plays quite like it too - but it's very classy and Exclusive preview.

COUNCIL
NOTICE...
SHAPE
UP OR
ELSE





Repoball - The Arcade diary draws to a close with the adventures of the cutest ball in the universe undergoing its final tweaks.



...d lots of fun.

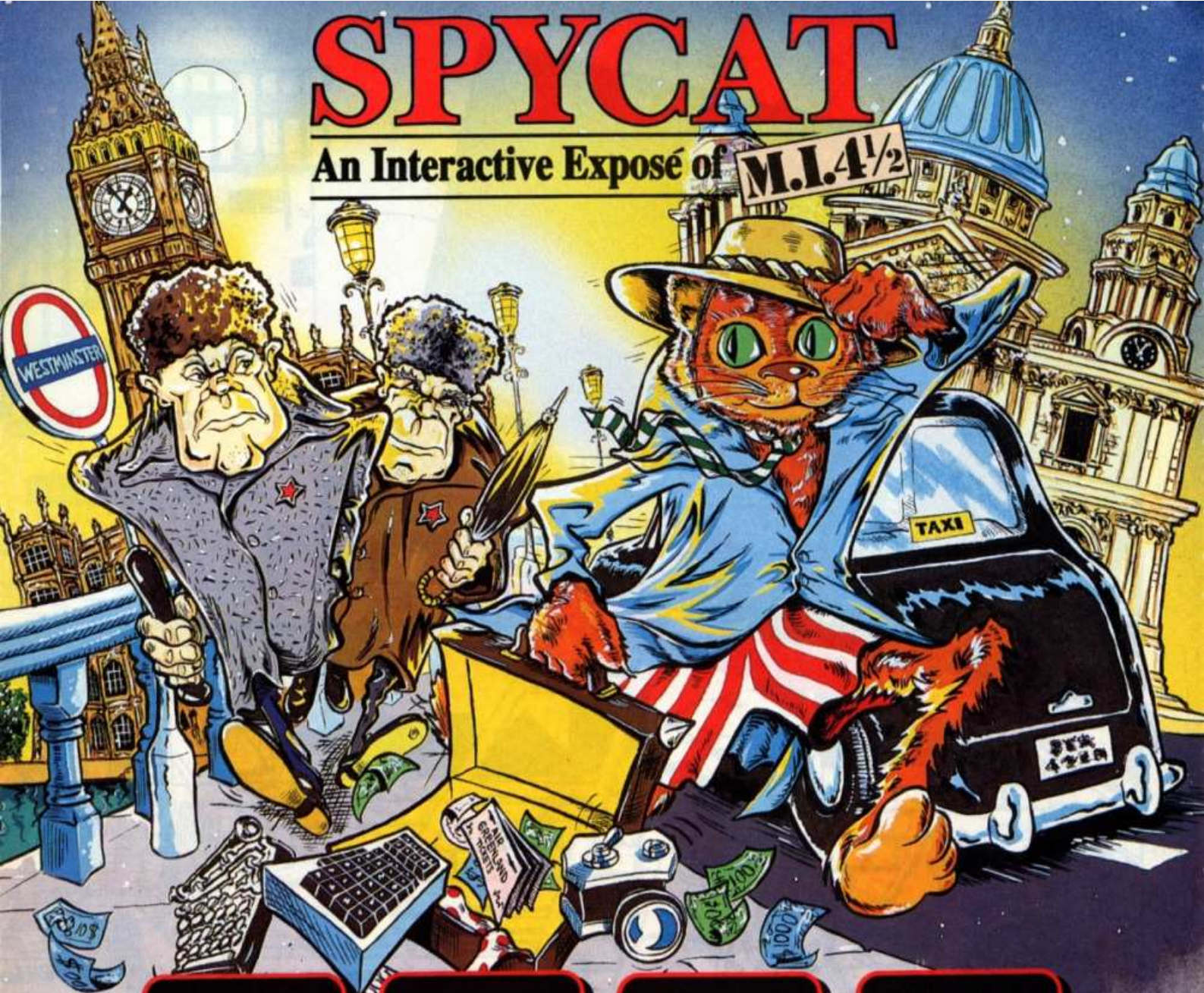


Breakthrough - Shift those boulders, build them up, zap them. Is there no peace in this multi-screened homage to instant frustration? Exclusive preview.



SPYCAT

An Interactive Exposé of **M.I.4 1/2**



The London Skyline
Viewed from Blackhall



Outside No. 10
Downing Street



Meeting the P.M.



Waiting to see "M"

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The game features nearly 100 different screens, with 30 different objects — including computers and passports — to locate and employ in appropriate ways. An icon-driven control system is used to orchestrate your manoeuvres and actions. There are secret passages to discover, and hatches and lifts to assist your progress. Guest appearances are made by: the Prime Minister and the spy-chiefs "Q" and "M".

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But then I do have a demo version with 255 lives!

The plot, as always, is simple. Aliens have landed and your hero (Colonel Shark) has to beat three waves of them single-handed. The graphics are largish and effective and the different backgrounds of the first two levels work well – jungle and industrial complex. In fact, the slight judder in the scrolling makes the screen high trees in the first level even more effective – there's a suggestion of 3D thanks to optical illusions.

On each level you must blast hell out of a selection of baddies – single soldiers who walk or fly, trucks which throw bombs and helicopters which drop bombs. If you're lucky enough to get through that lot there's an unpleasant flying saucer at the end of each level to defeat too.

One really nice touch is the fact that some enemy soldiers leave behind weapon packs which you can pick up for extra help – rifles, machine gun, extra height jumps, invincibility or extra lives.

Oh, didn't I mention the jumping? That's a neat touch too – as well as moving inexorably left to right, your hero can leap about the screen, laying down a barrage of rapid fire.

All good fun I suppose. What is certain is that Inglis has produced an instant classic which, rightly or wrongly, makes a better sequel to *Stryker's Run* than *Codename: Droid* did, although that was a more complex game.

There's certainly nothing complex here – just loads of fun and excitement. Well done, ASL – let's see more games of this quality.

Manchester Hit

The big games hit of the recent Manchester BBC Show was, I'm assured, the grand launch of Mandarin's arcade adventure *Mission Icarus*.

Modesty almost forbids me to mention that this was fully previewed here back in the April issue and it seems to me that I could do worse than remind you of what I wrote then (thinking it was to be released by new software house Powerhouse Software:

"A more than competent game by Julian Avis, best known for *Dunjanz*. Unfortunately, this has quite a lot of the same feel of that earlier release – the two player option, the objects to be run over to gain energy or open doors, the exit doors that can only be opened when a level is clear of objects, etc.

Oh yes, that etc also includes the split-screen overhead play which is attractive but distracting. We have a pretty playable game here that won't, I don't believe, hold your attention for long.

'As we've seen far too often, your mission is to clear a drifting spaceship of malfunctioning droids and destroy the central computer before time runs out. Originality would be nice.'

And the summary? "This should amuse you – just don't expect to have your mind blown." I see no reason to change my earlier comments.



So Farewell, Then

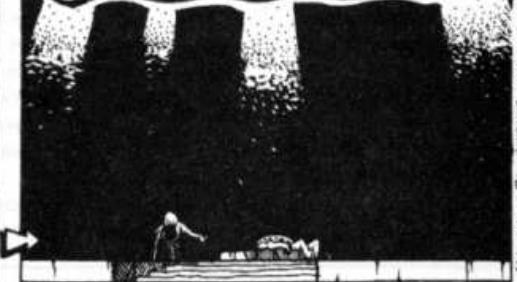
We've a bit of space to play with this month so I'll take a couple of lines to say farewell to Steve Botterill, until a short time ago Superior's software development manager.

Although Richard Hanson has always been the guiding force up there in Leeds, Steve has been an invaluable friend to games players with his troubleshooting of new games, his work with programmers and his general enthusiasm for the whole Beeb games field.

His new life? A kind of consultant role, so we'll still see his influence in future Superior product. Bye Steve, and thanks for some great games!

T. Glover presents... TROGG... for A&B 1988

NUMBER 8



Five Years Ago

You can always tell when journalists are groping for copy to fill the page – out come the anniversary issues, the historical perspectives and so on.

Well, I hate to break a tradition so here is a brief look at the software choice you'd have been faced with five years ago – June 1983.

The first surprise is that some companies have vanished completely – take A'n'F for instance, still at this stage some time before the classic *Chuckie Egg*. No, up for grabs back in '83 were such gems as *Painter, Planes, Frogger, Lunar Lander* and two adventures *Tower of Alos* and *Pharaoh's Tomb*. Interesting too to note that a big selling point in those dark days was the legend 'written entirely in machine code'. Still often meant rubbish then.

What about Acornsoft then? Still an age before becoming linked with Superior, we see the 'high-resolution' *Starship Command* and the still classic adventure *Countdown to Doom plus new release Rocket Raid*, the 'amazingly addictive arcade game which can be played with a joystick or keyboard'. Moving on past nightmarish ads for twin 800K disc drives for only £599 (gulp!), what about Superior?

What indeed? Well, do you fancy *Centipede, Frogger, Road Runner, Alien Dropout, Space Fighter, Galaxians, Invaders* or *Fruit Machine*? All top quality machine code

programs, not too many of them now appearing on the 'best of' compilations emanating from Leeds. Pity that – I used to enjoy *Galaxians*.

Remember Digital Fantasia? No, neither do I but it seems that they used to release adventures written in 'ultra-fast machine code'. As opposed to 'ordinarily-fast machine code', I suppose.

Ah, *Great Britain Limited*. Conjure up any memories – seems that the idea was to try and get Maggie Thatcher elected again. No wonder it never caught on – too depressing.

Then, of course, there was always 'Britain's leading software house' – Micro Power. Where are they now, post-Imogen? Back then it was the delights of *Moonraider* with 'six phases to get through and four levels of difficulty'. How did we cope with the excitement?

Ah, here's a name to bring a lump to the throat – Kansas City Systems. Back then it was a choice of *Bomber Scramble, Cosmic Fighter* or *Space Cab*; now it's *Loony Loco*.

Here's a classic, though: Doctor Soft's *747 Flight Simulator*, still worth tracking down if you can. But what else? Did anyone ever respond to Glengary-Soft's plea for Beeb games writers? After all, they did offer 40% royalties.

But the final classic from this trip down memory lane (courtesy of *Micro User* July 1983) is still a winner – Micro Power's *Killer Gorilla*. I still play it – do you?

names, so we have The Thunderbird, The Firebird, The Bluebird, and The Freebird(!), which are yellow, red, blue and green (or white or light blue!) respectively. Each one has a secret, hidden trick inbuilt and it's up to the player to find each one by his or her self. They aren't essential to the gameplay but they'll come in pretty damned handy.

Wednesday, 24th February. Started wading through the Repoball disks and noted down all the different bits and pieces that have accumulated over the past couple of months. Got a few nice surprises, seeing graphics that I had totally forgotten about. Wiped a few embarrassing files!

Thursday, 25th February. Was going to write the compressor but woke late and couldn't be bothered doing any work.

Friday, 26th February. Chucked a few ideas about with some friends and weeded out the unpopular ones. The ideas, I mean, not the friends. One particular favourite (idea) of mine was met with stiff opposition so that was the end of that experiment.

Saturday, 27th February. It was actually half two on Sunday morning before any work started. You see, I was about to collapse into the pit when my conscience forced me to work on the long overdue coding of the compressor. The code only took thirty minutes. It worked a bit above and lot below what I expected. This worried me and would mean that I'd have to use up memory that I'd set aside for other things. Then I noticed that the damn thing was only running at 60%. I kicked it up all the way and re-tested. This gave the results I was expecting and better in most cases. Things are going well at last.

Sunday, 28th February. Worked through most of the graphics and had a look at how far they compressed. In most cases, they used

Preview Part Two

Another early peak at a new game, thanks to new product manager at ASL Dean Lester – you remember Ziggy, of course?

This time it's not quite as interesting, I'm afraid. Another new name to me, Ian Collinson, has coded what ASL are calling a 'strategy arcade game similar to *Solomon's Keys*, which has never been converted to BBC format'.

The game, over 100 screens, is quite amusing but didn't hold my attention for too long. On each screen there is a key to collect which you must reach by building or destroying blocks. Against a time limit, of course.

The graphics are a little coarse and I didn't find it all that playable – it's not really like *Pengo* but you have the same frustrating element to it. I guess for some reason that the graphics remind me of *Jet Set Willy*, though for some of you that will be a recommendation.

I'm unconvinced about this, if the truth be known. I can see that a lot of you will really enjoy it, but it's not really for me.

Still, I'm bearing the name of Collinson in mind for the future – there's a lot of promise here.

Five Years Hence

Can we do the operation in reverse? What shape (if any?) will the Beeb software market be in?

Will we all be playing wall-screen sized on-line interactive games? Will processing power have moved on by another factor of ten? Will the Beeb be seen as a quaint reminder of the days before the credit-card sized mainframe? Will we all be playing with Cray consoles?

God knows! You tell me.

Repoball Diary

Doncha just love the Post Office – oops, The Post Office? Here I was sitting, the worst month for games in the history of The Arcade, and what should be missing somewhere between the glory that is Glasgow and the licentiousness that is London but John Mackay's final Diary entries and a full, working demo of *Repoball* for me to share with an eager and expectant world.

Oh well, these things happen I guess and, no doubt, it's all part of the adrenalin rush of being a columnist that a very close-to-finished demo should turn up the morning I'm supposed to finish this column.

Meanwhile, before next issue's full-blown analysis of the working game, I have a few days of John's blow by blow (or sleep by sleep) account of the creation of his latest game to keep you reasonably content.

The plot, for those of you new to this, is simple – John Mackay, coder of the disappearing *Green Beret* and the very playable *Krakout!*, set himself a simple task – write a game quickly, make loadsa money and intrigue Arcade readers with an insight into the darker recesses of a programmer's soul.

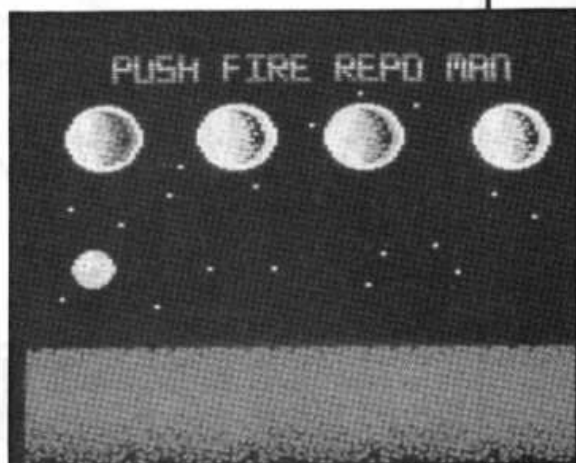
When we last heard from him, it was February 20th, the project was about two months over schedule, and the game was 'very nearly complete'. What next?

I'll let John explain:

Sunday, 21st February. Went on a bike run.

Monday, 22nd February. Spent a day in the town.

Tuesday, 23rd February. Spent most of the available time working out each Repoball's individual capabilities etc...and named them. They all have 'Bird' at the end of their



less than a third of the space they normally would and in a few cases, a quarter.

Monday, 29th February. Didn't have much time to do any work on the game so I just collected all of Repo's animation frames and the explosions and saved them as one block. I entered the appropriate data into the animation file so that it's ready to go.

Tuesday, 1st March to Thursday, 10th March. Tied up at the moment.

And there the whole sorry tale ends. Join us next month for the final gripping instalment and a full preview of the game...

Competition Time!

What would The Arcade be without a competition involving Darryl Still, now boss man at Go-dax? Probably even more exciting.

Nevertheless, he tells me that special Go-dax T-shirts, sweatshirts and polo shirts are now available direct from Paul Yates, Systek Software, Newcastle House, Rowlands Gill, Tyne & Wear for just £4.95, £8.95 and £12.95 respectively.

How could you resist such a bargain, especially when Paul will produce loads of other designs as well? Well, one way would be to enter our special Go-dax competition with five (count 'em!) T-shirts lying here for the lucky winners.

And all you have to do is write in and tell me how many colours appear in the Go-dax logo. Simple? You bet.

Meanwhile, I don't even want to mention the piles of free Bogie badges I've got here for anyone diseased enough to want one. Just write in and say: 'I'm sick enough to desire a Bogie badge that has been blessed by the fair hand of Darryl Still'. The lucky ones will be certified, the rest get badges.

Yes folks, up for grabs, is a super cuddly-wuddly Spycat toy (a better bedtime companion than some ex-Cambridge Univ spys!). Also up for grabs are any three games from the Superior Software catalogue (oops sorry) – any BBC Micro/Electron version could be yours.

For twenty runners up, there will be prizes of any one game from the superior software catalogue, so if you didn't want **BMX on the moon**, then you could always go for **Zarm**,



or even grab some **Ghoulies!** (oer – Assistant Ed.)

The competition? All you have to do is to pick out each letter from every item Spycat can obtain, arrange them into two names of our most famous spys, and send them in to us at A&B Computing, No 1 Golden Square, London W1R 3AB – don't forget to mark the entry postcards to Spycat himself...

And Finally

And finally, welcome to the end of the strangest Arcade yet. One thought consoles

me in my hour of despair – you're probably still getting the best value Beeb games column here, even in severely truncated form.

Next issue, all should return to normal. Did I mention, by the way, that I've been mega-busy selling and buying a house over the last few weeks. Anyone know a plasterer who doesn't charge loadsa money?

Apart from that, do please write in. I enjoy it, my postman enjoys it and the other readers of The Arcade enjoy reading it all too.

Send all goodies to: **Dave Reeder, The Arcade, A&B Computing, ASP Ltd, 1 Golden Square, London W1R 3AB.**

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EMULATION STATION

Archimedes & Emulation

With every Archimedes computer come two programs; **6502** and **BBCrun**, these programs have been supplied by Acorn to enable users of BBC Micro programs to effectively run their software – be it in BASIC or Machine Code – on an Archimedes.

The BBC Micro, in all its myriad forms as the Model B, the Master 128 and the Master Compact has a massive user base as far as a British Computer is concerned, however, for the time being, the Archimedes' software base needs to be supported, and to this end Acorn have seen fit to effectively emulate a BBC Micro in order to run specific software titles including Acorn's own View family, the Inter Series from Computer Concepts, and other "legal" software titles.

The two programs are really two separate halves of a larger program, enabling the Archimedes to behave as if it were a BBC Micro, but considered on their own, they can be useful items in their own right.

Emulating the 6502

Naturally, the ARM processor needs to emulate a 6502 processor if it is to be able to run the majority of software titles available for it, and to this end, the ARM has been effectively "reprogrammed" to behave as if it were a 1.5 MHz 6502.

Readers of my earlier article (What is a RISC) will see the reasoning behind such an emulation, and the mechanics involved are quite complex (thus the emulation slows the ARM down to quite considerable proportions – none of which are desirable).

In the same article I reiterated the proclamation central to the whole ethos of RISC processors *any function that is achieved through hardware, can be equally attainable in software*. This is an important thing to remember as the ARM processor will be mainly a programmer's processor and not a hardware developer's chip – current Archimedes computers are delightfully simple, the hardware devices having almost direct access to the ARM's bus. This also means that the ARM is a pig of a processor to properly program, and when I say properly, I mean to make the source code compact, efficient and not too demanding on the ARM's pipeline.

In order to circumvent the traditional problems of emulators, Acorn's approach seems to be a very sturdy, yet straightforward one. In theory it is possible to write other emulators for different 6502 series machines such as the Apple 2, the 2e and the 2c, the Commodore 64 et al. Strange as it may sound, entirely unconnected emulators are already with us in the form of Acorn's PC Emulation, a software only package retailing

at £99 from Acorn – but this must be really only seen as yet another stopgap, until the Hardware podule comes along.

What is compatible?

Naturally the first thing anybody is going to ask about the emulator is "How compatible is it with my BBC Micro's programs?", and "is it really going to run all of my programs?"

The answer is a reserved yes – the package is very compatible, but when explaining how I gauge the compatibility question, I normally refer them to the BBC Micro's 6502 second processor. If programs work with the tube Active, then the chances are that it will work with the BBCrun program. The 6502 Emulator (which BBCrun uses) is far too eclectic about code to be used on its own.

For example, 6502 machine code (such as multiply and divide routines) will work with the Emulator – if you know how to create the right binary image, the most likely method is to write the machine code using BBC BASIC's own in-line 6502 assembler and then assemble it whilst under the tender mercies of BBCrun, in the past, this is the most reliable means of writing and running BBC-based 6502 code on the Archimedes.

A problem that cannot be completely avoided when using the 6502 emulator is that of directly accessing the BBC Micro's memory (DMA) by poking (or peeking) various addresses, this cannot be completely trapped by the BBCrun program – amazingly enough, this program does its best to redirect PEEKs, POKEs and other forms of DMA intended for the BBC Micro's memory map to the relevant Archimedes addresses, but in some (critical) cases, BBCrun just cannot cope. The answer is *don't DMA*, always use the BBC Micro's vectors. I know it is cumbersome, I know it is slower than you would like, but using Acorn's vectors ensures a greater user base and degree of compatibility.

Experimenting with the ARM's excellent trapping facilities whilst using the emulator proved laughably slow, a program can be slowed down by as much as a factor of ten in comparison to running the same code on a BBC Micro.

On a similar line calling undocumented features in the firmware (ie, BASIC, the ADFS, other sideways ROMs and, of course the Acorn ULA for the BBC Micro) will be an intractable problem.

Accessing hardware directly is another no-no as far as Acorn guidelines are concerned; however, it seems that the BBC Micro podule (1MHz bus, User port, Tube interface and the provisional Disc interface) will all accept direct memory accessing, but

this will require a specially kludged version of the BBCrun program, altering certain pointers so that they relate to specific addresses not supported in all machines – ie, BBC model B versus Master 128 addresses for certain ports. Directly accessing the Floppy Disc Controller is impossible as this is handled by DMA's from the ARM.

The DFS is quite different from the ADFS; being only a 31 file disc structure, all directories are accessible to each other, and all are visible. The ADFS however, has a hierarchical "tree" structure (see figure one), and is therefore only compatible if all disc accesses (from within a program) are restricted to single letters, and work within the "\$" (or root) directory.

BASIC Programming and BBCrun

Compatibility between Archimedes BASIC and BBC BASIC (for the Model B, the B+ and the Master 128) is very high, however, programs that have been ported straight across from one machine to the other will needlessly to say, have to be "hacked about" a bit.

Arc BASIC (also known as *BBC BASIC V*) is 100% command compatible with its older predecessors, however a few problems can arise when using earlier versions, (not for the Arc) for example, the usual problem concerning the pseudo variables PAGE, HIMEM and LOMEM may cause problems *because the Archimedes memory map is, by definition, different to that of the Master or the Model B*.

In general, the 6502 is able to handle relative changes such as `HIMEM=HIMEM-100`, and for most of the time, this is how most packages change memory locations. The BBCrun program will be able to manage most attempts as pushing up OSHWM, although some routines used by Model B Arcade games will not be allowed, as these require disabling the ADFS filing system to one less memory greedy (I thought I would never say that about the Arc!).

Again, I would say that if the routine is compatible with the 6502 Second Processor, then I would say that the package will work under emulation – but don't quote me on that!

Do not poke into zero page because if you do, you will most certainly corrupt the Arc's internal memory, and a reset will be the only way out. Poking Zero Page on a 6502 (which is reserved for pointers and stack information) is a standard practice amongst professional BBC Machine Coders, whilst this will work for the 6502 processor, such memory constraints do not exist on the Arc – you can do it with the current release of the ARM, and this will feature in a future article at a later date.

Archimedes

C O M P U T I N G



ST vs Archimedes

The Archimedes and Atari 520 ST - Competing machines in a tough marketplace

Dear Sirs,

In reply to your 'How About You' on page 52 of the September 87 issue:

I, at the moment, use an Atari ST computer with Computer Concept's Fast Basic to help run a couple, of family business' (Engineering and Private Ambulance) and keep the wife's bank account in the black.

Fast Basic is just that, fast, but progressing up from a BBC B the first thing one noticed was how painfully slow GEM is at writing to the screen.

I am now the proud owner of an Archimedes 310 and having used it for a few weeks I have two

observations, it's very fast and the keyboard is bad, atrocious even. On a £1000 computer you expect a reasonable keyboard, although the layout is superb the key action is woolly, needing heavy fingure pressure to make a contact (my fingers start to complain after a short stint of rapid typing). It positively deters you from typing fast. My wife is a freelance consultant and teacher of Word processing software (Her typing speed is 84 words a minute!) and has intimate knowledge of IBM Displaywriter and 8100, Multimate, Wang, Phillips P7000, ICL DRS, etc and the associated hardware.

She loathes using the machine *because* of the keyboard (loves the colours and text fonts though). So if Acorn expect the machine to be taken more seriously than a good graphics box then please change the keyboard (they can't be that arrogant). We want to see the machine and company do well.

But on the plus side it looks, on initial acquaintance, to be far easier to program the window environment than either the ST or Amiga. The supplied manual is not up to the usual standard and any form of user customisation or useful programming needs access

to the reference manual (the CONFIGURE command for instance has only a few of the options described), again I hope this will be better with September onward machines.

I am in the process of transferring the Atari Fast Basic software to the A310, this being quite straight forward as the main reason for buying Fast Basic was its BBC BASIC like syntax (I know a lot of old BEEB users moved to the ATARI and use Fast Basic). The software includes Invoicing, Bank account, Sales Day book, and Name and Address database and it is very satisfying to run the

Continued over



Printer Support

Dave Clare, owner of Clares, has confidently launched the new support disc for Clare's Archimedes art package because of the feedback he is getting from art departments in schools and colleges around the country.

Dave says that many art departments have wanted to use computers but could not justify it with previously available systems. "Many art departments are pur-

chasing the Archimedes just to run Artisan" he says.

The Integrex 132 colour inkjet printer apparently remains a favourite output device, two dumps for which are included in the Artisan Support Disc. The HQ dump requires the use of a high quality paper. There is also a dump for Epson EX800/JX80/Star LC10, all dot matrix printers with colour option, as well as two mono dumps and a dump pattern editor.

RISC workstation

Olivetti recently confirmed to million loss incurred by the computer journalists assembling Cambridge outfit. Olivetti's in Paris for a product launch that they would be marketing a workstation based on Acorn's RISC technology.

Further financial commitment to Acorn has been indicated after the recent three colleagues in Milan.

Pipedream for Archimedes

Colton Software have added to the flood of wordprocessors for the Arc with a version of Pipedream. Pipedream is built into the Cambridge Z88 portable, is known as View Professional for the BBC Micro and has recently been released for MSDOS machines. All versions are file and keystroke compatible.

The Archimedes Pipedream incorporates the same combination of wordprocessing, spreadsheet and database functions in one "window". The new features for Archimedes include easy mail-shots, macros, keyboard programmability and Lotus file compatibility. The user interface has been simplified by the use of pull-down menus for all commands.

Robert Macmillan, managing director of Colton Software, said "PipeDream's View family heritage makes it the ideal choice for BBC users upgrading to Archimedes. Archimedes brings power to your elbow, PipeDream give you power at your fingertips." Nice quote and software to look forward to.

Colton Software, Highcroft, The Avenue, Madingley, Cambridge, CB3 8AR. ☎ 0954 210928.

Next Generation

Acorn claim that a succession of local education authority orders for Archimedes computers reflects a growing move towards the Arc as the successor to the 8 bit BBC Micro in education. Derbyshire Education Authority has placed an order for more than 70 machines with Nottinghamshire, West Glamorgan and Cambridgeshire following suit.

"We chose the Archimedes for the IT in Schools Scheme because it meets all the requirements set by the Department of Education and Science for funding under the scheme" said Elizabeth Cole, Senior Inspector for Microtechnology and Learning Resources in Cambridgeshire.

The yearly round of computer equipment buying has seen the Archimedes win out. Derek Ellerby, Education Advisor for Nottingham Education Authority says "A wide range of 16 bit machines available in the market were under consideration, but our final decision was to make the leap forward from the 8 bit BBC Micro to the powerful 32 bit microcomputer which will meet the ever increasing curriculum demands for years to come".

The fact that existing software can be run seems to be one deciding factor in the success of Archimedes. So also is the investment in an advanced technology which is unlikely to be superseded for a good many years. In the same way that the old 8 bit BBC Micro was the most advanced micro of its kind back in 1983, so the Archimedes promises the sort of life span which schools require of their equipment.

Zarch

With some versions of ZARCH on the new OS 1.2 the sound is wrong due to the positioning of the stringlib and percussion modules. For ZARCH the percussion module needs to be initialised before the stringlib so the voices are correct.

A simple program below swaps the modules around.

```
10 REM * ZARCHY
20 ★ UNPLUG STRINGLIB
30 ★ UNPLUG PERCUSSION
40 ★ RMREINIT PERCUSSION
50 ★ RMREINIT
60 P. "Now boot ZARCH"
```

When the program is run it will swap the modules around. Then all that needs to be done is to boot ZARCH, and if anybody's interested my highest score on ZARCH is 70359.

Yours faithfully
A. VALENTINE

P.S. This was prepared on ARC-WRITER, and has anybody found a list of names, in the new OS 1.2 of ACORN's 'boffins' who helped get the ARCHIMEDES off the ground, as there was a list of them in OS 0.2

Also, to get the extra fonts

using the ★COUNTRY option hold down SHIFT, CTRL and ALT at the same time. Then release and the next character typed will be in the selected font.

Education datafile on Delta Plus

Nick Evans' Datafile of Educational Software and Addresses is now available on System Delta Plus for the Archimedes. The datafile has grown to 3200 records with 960 address entries. Price is £20.00. Nick Evans, PO Box 55, Grimsby, DN32 0QB

Taking Account

Minerva have completed the conversion of their five Business Accounting modules for the Arc. They are available individually or as a suite and there are integration facilities for Mailshot and SigmaSheet or GammaPlot. The Nominal ledger has a built-in option to export the data to a spreadsheet to produce an up to date cashflow.

Graphs and reports are supported as are stock management and double entry book-keeping. Passwords can be used if required.

Minerva Systems, 69 Sidwell Street, Exeter, EX4 6PH. ☎ 0392 37756

Teleport

AV Systems have produced a program for BBC to Archimedes file transfer. The software uses the WIMP environment to control the whole operation, including the BBC end. Teleport handles both DFS and ADFS files and also recognises file types and directories. The £15.99 price tag includes software on 3.5" disk, two metre cable and instructions. If your's is one of the first 50 orders you get a free program too!

AV Systems, System House,
69/69a Holroyd Hill,
Bradford, W.Yorks, BD6 1NS.

Conqueror Cheat

After the Zarch cheat published in the March edition of A&B Computing (and on Red Keys 2 disk), Mark Harrison of Wokingham, Berkshire, decided that a cheat for Conqueror was required. Conqueror is the brilliant tank simulation from Superior.

Type in the listing, save it and run. It will, after 40 seconds, reset the German King Tiger tank to a "Tabby" tank.

With front and side armour of 240 and none on the back, a top speed of 176 km per hour on any terrain and rapid fire 255mm gun, it looks like a Panzer III with King Tiger turret!

Anyone interested in taking on this monster tank need only turn to our listing. The cheat can also be found on our Red Keys 3 disk.

LISTING

```
10REM >ConqZap
20REM Program Conqueror Che
at
30REM Author Mark Harrison
'88
40REM Copyright ASP '88
50:
60:
70FOR pass%= 0 TO 2 STEP 2
80P%=&7E00
90[OPT pass%
100.int
110mov r0,#&1000
120adr r1,set
130adr r2,data
140swi "OS_CallAfter"
150mov pc,r14
160.set
170stmfd r13!,(r0-r3,r14)
180ldr r0,addr
190mov r1,#&80
200bl loop
```

```
210ldmfd r13!,(r0-r3,pc)
220.loop
230ldr r2,[r12],#4
240str r2,[r0],#4
250subs r1,r1,#4
260bne loop
270mov pc,r14
280.data
290FNdata(1)
300.addr
310EQUD &8038
320]
330NEXT pass%
340PRINT "Insert Conqueror
Disc and press Space"
350REPEAT UNTIL GET=32
360MODE 13
370CALL int
380OSCLI "mount"
390OSCLI "exec !boot"
400END
410DEF FNdata(z)
420RESTORE 510
430d=0
440WHILE d<>&12345678
450READ a,b,c,d
460[OPT pass%
470EQUD a:EQUD b:EQUD c:EQUD
d
480]
490ENDWHILE
500=TRUE
510DATA &62626154,&20202079,
&20202020,&00202020
520DATA &F0F0046A,&FF000000,
&800A025C,&170000B0
530DATA &0E38E38E,&F8E38E39,
&15555555,&00A00000
540DATA &012C0000,&012C0000,
&C00115A0,&000115AC
550DATA &00011594,&0001157C,
&FEAC0000,&FFE20000
560DATA &00000000,&00011690,
&0001169C,&003C0000
570DATA 0,0,0,0
580DATA &00000000,&000114F4,
&00016C00,&00012034
590DATA 0,0,0,&12345678
600
```

From ST vs Archimedes.

two computers against each other for speed comparisons. The A310 floppy disc access is far faster than the Atari (as an aside the Atari is subjectively faster than colleagues' Amigas) seeming about 5 times so and the screen writing is phenomenally fast (I use screen MODE 12 or 14).

For instance one option on a sales book program allows you to list a page of invoices to the screen from floppy, on the Atari it plod, plod, plods along (a name scrolling on the screen about as fast as you can read a plod) taking 12.28 seconds for 24 lines, the A310 does it in 0.68 seconds, an 18 fold speed difference. Doing a straight list of names from an array to the screen takes 2.42 seconds on the Atari and a blink of the eye 0.10 seconds on the Archimedes. All very impressive when you read that the Atari has a 68000 8Mhz CPU that is supposedly capable of 1-2 MIPS, only half that of the Acorn.

The only reservation at this point in time is of course software. The machine comes bundled with

some reasonable demonstration software and will, I believe, be supplied with a free Word processor in the future. Good software makes or breaks a computer no matter how fast and colourful it is. If the difference is in doing a job in 20 minutes on an IBM PC or not being able to do it at all you would have to plump for the 20 minutes. Why do you think IBM and its cloners sell so many. Let's hope the software appears sooner than later. I use VIP professional on the ST (a Lotus 1-2-3 clone) and I know I am going to miss it. Perhaps someone in the know can tell me if Acornsoft or Computer Concepts have a products that is similar.

All in all if you want the most responsive, satisfying, powerful, friendly computer around, buy British, buy an Acorn Archimedes. You won't regret it. Now back to my ARM assembler manual.

Yours faithfully
Ian P. Pomeroy

Essex
P.S. Acorn, please change the feel of the keyboard.

Archive

Subscription Magazine & Support Group for Archimedes Users

- **Archive** is a professionally produced magazine (A5 laser-printed) written by enthusiasts (i.e. people like you!) for enthusiasts.
- **Archive** contains news, views, reviews of software and hardware, programming ideas, as well as more general articles but above all, it contains reams of hints and tips.
- **Archive** started in October 1987 on a limited circulation but the earlier issues have now been re-printed so that all issues from Volume 1 No 1 onwards are still available.
- **Archive** has 12 issues a year and 50 pages per issue for just £12.50!
- **Archive** also runs **Eureka!** bulletin board (0603-250689 on 300/300 or 1200/75) - news, down-load software, mailboxes, chat line etc.

Technical Help Service: £8/year
A telephone hot-line service for immediate help with your technical problems. Any member can send written enquiries, but for a fast response use the THS!

Members' Discount:
7.5% off Computer Concepts, Minerva and Clares software purchased through Archive.
Overseas Subscription:
Europe £18, Middle East £22, America/Africa £25, Others £27

Archive UK annual subscription: £12.50
Send cheques to: "Norwich Computer Services",
(Sorry, no Credit Cards)
18, Mile End Road, Norwich, NR4 7QY.
For more details ring Paul Beverley on 0603-507057.

Archimedes

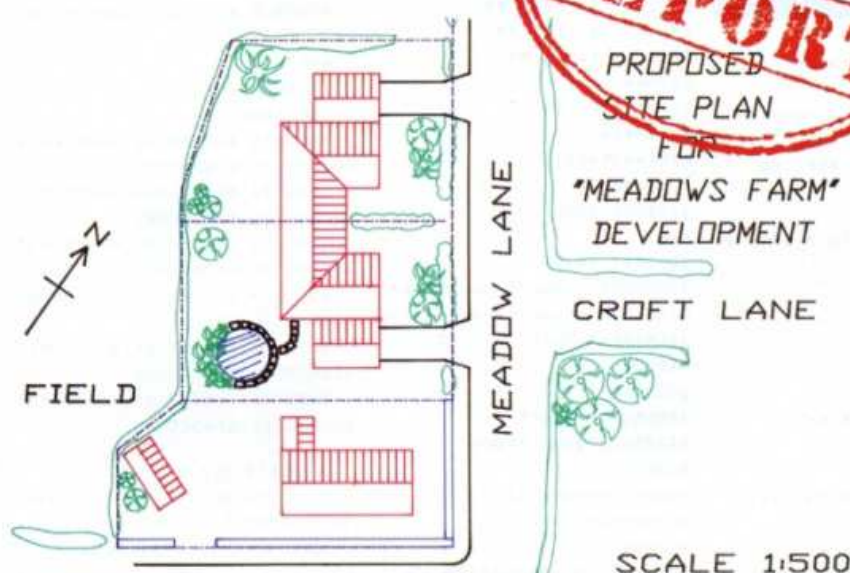


Figure 4
Meadows Farm - as seen from Autosketch, with this example you can zoom up to any point with remarkable accuracy.

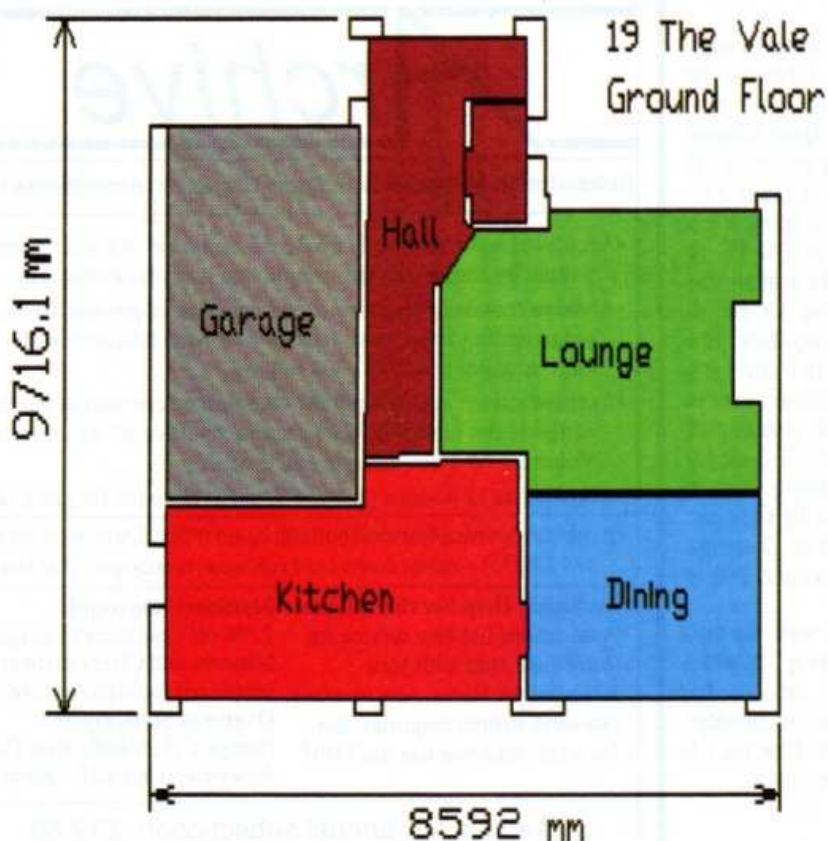


Figure 5
The High Quality Dump package for the Integrex colour printer offers very high resolution dumps with a remarkable density of colour.

Towards The Personal Workstation

Introduction

AutoSketch is a precision drawing package that shows to great advantage on the Archimedes. It can also make use of a multi-frequency monitor, and the 20MB Hard Disc upgrade (more of which later).

AutoSketch (for typing's sake I will call it AS from now on) is a precision drawing package with a friendly appearance that makes it particularly well-suited to the beginner or occasional user. At the same time it has great "depth" and provides many of the features of a two-dimensional Computer Aided Design (CAD) package. Although inexpensive, it can output drawings either directly to a wide range of plotters and graphics printers, in both mono and colour, or as files for incorporation in other documents.

This review is based on a "late beta-test" version for the Arc, which Autodesk said was representative for functionality, but was subject to some tidying up of details. I found it to run very fast, and to have several other advantages over the PC and Nimbus (collectively DOS) versions.

Setting Up

As input devices, the Arc version of A.S. supports only the Arc mouse (and therefore the Marconi Trackball, with a suitable lead). Since the mouse is standard, there is not even the option of using the cursor keys. Only one button (the left) is used by A.S.. No digitiser pad is yet available.

For display, A.S. supports both Mode 12 (with 256 scan lines, for standard monitors), and Mode 20 (with 512 scan lines, for multi-frequency monitors). To work in Mode 20, the Screensize should be configured to 0 (or 20) on a 310, and the Monitortype configured to 1. With twice as much data on screen, and taking more of the processor bandwidth, Mode 20 implies slower drawing, as well as less RAM available. However, re-drawing takes only 20 to 30 per cent longer, and this is a small price to pay for the even better screen display.

In Use

A.S. comes on a single disc, and is started from the "star" prompt by pressing Shift-Break. However, entering *FPE, then

Table 1						
AUTOSKETCH		MENU		MAP		
DRAW	CHANGE	VIEW	ASSIST	SETTINGS	MEASURE	FILE
Arc	Undo	Last view	Ortho	Attach	Distance	New
Box	Redo	Zoom X	Frame	Colour	Angle	Open
Circle	Erase	Zoom box	Grid	Curve	Area	Save
Curve	Group	Zoom limits	Snap	Grid	Point	Save as
Line	Ungroup	Zoom full	Attach	Layer	Bearing	Make DXF
Part	Move	Pan		Limits	Align dimension	Import IBM
Point	Copy	Redraw		Line type	Horiz dimension	Make Sprite
Polygon	Stretch			Part base	Vert dimension	Pen info
Text	Property			Pick	Show properties	Plot area
	Rotate			Property		Plot name
	Scale			Snap		Plot
	Mirror			Text		Information
	Break					Make Slide
						View Slide
						Game
						Quit

*SKETCH /R allows A.S. to be re-configured – for input device, display mode, and output device and port.

All the functions of AutoSketch are available via pull-down menus. See Table 1. These show that twenty functions are also available on function keys, which may be labelled with a key strip (plotted from an A.S. drawing). In general, you cancel one function by entering another. Although the primary menus are Draw, Change and file valuable secondary functions are provided by the other menus, and these may be accessed at any time.

In the "Assist" menu, "Ortho" constrains lines to be exactly horizontal or vertical, "Snap" constrains points to a rectangular grid, and "Grid" provides a visible grid. The last two are both adjustable in X and Y (under "Settings"), and may differ. "Frame" turns the Spline "Curve" frame on and off. This consists of the control points used to define the curve, and turning it on makes it possible to change the shape, and easier to select for moving or erasing. When "Attach" is "On", the pointer will "find" the nearest existing point (within a "Pick" distance that is also adjustable under "Settings").

Drawings in A.S. may have up to ten logical "layers", which are selected in the Settings menu. As well as the seven colours shown in the "Colour" dialogue box, it will accept colour numbers 8 to 15 – which produce bright versions of the same colours, since the Arc supports 16 colours in both Modes 12 and 20. Hence, provided that the layers are drawn in, or have been changed to, different colours, it is possible to have all ten visible at once, without confusion. However, only seven colours can be plotted, and bright magenta is already used to show temporary lines etc, such as "rubber bands".

The "Settings" options each bring up dialogue boxes, which allow almost all the Drawing and Changing functions to be adjusted to your liking. Since these are stored with the drawing, you can save them in an empty drawing as a template, for repeated use.

Drawing

One technique for creating a scaled drawing is to set up construction points as "nodes" (perhaps using a Grid and Snap), and then draw lines between them (with the help of Attach). A point may be entered with the mouse, or from the keyboard as absolute linear or polar co-ordinates, or as relative linear co-ordinates. Point co-ordinates are not shown continuously, but may be displayed, and to 6 significant figures. Angles, areas, distances, and bearings may also be measured, again to 6 significant figures. However, these work just once – not until another is selected. The results are held as

"system variables", such as "last point", which may be entered by name in place of numbers. When drawing a line, it is quicker (and no less accurate) to enter the first point with the mouse (assisted by Attach), and the second point from the keyboard. If you continue with the mouse, as you move from the first point, a "rubber band" is shown in bright magenta. "Polygon" is a general "poly-line", capable of drawing a closed figure (polygon) as a special case.

A.S. does not support ellipses, but near-ellipses can be created using the Curve (and possibly Stretch) functions. The procedure is given in a supplementary booklet. "Curve" enables the entry of a spline curve, defined by up to 100 control points, which form a frame. After making any changes, this latter can be turned off. "Text" allows the entry of text according to the height, baseline or direction angle, width ratio, and obliquing or leaning angle set under "Settings".

Dimensions in A.S. are semi-automatic – ie once the points are identified, the values are supplied automatically. Moreover, they are updated if the objects concerned are Moved, Rotated, Scaled, or Stretched. For vertical dimensions, whether the text reads up or down is determined by the order in which the points are entered.

Changing

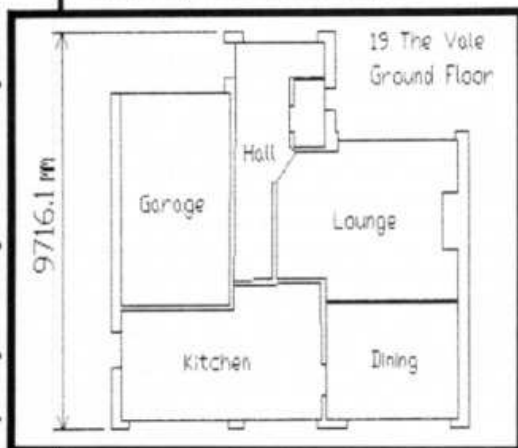
Perhaps the most "friendly" features of A.S. are "Undo" and "Redo" – which are available both as menu options and on function keys. These allow both simple operations (especially Erase) and complex manipulations to be reversed, and if necessary, reinstated. Moreover, they are not limited to just the last operation, but can be invoked repeatedly, back to the start of the drawing, and all the way forward again. Rather than holding a second copy of the drawing file in memory, an "Undo" file is held on disc, and updated periodically, so long sequences of "Undo" (and particularly "Redo") are understandably slower than re-entering the data, but much more accurate and convenient.

Although limited to 100 objects in a

View, Assist, and Settings

Three "Zoom" functions are available only on the "View" menu. "Zoom full" always gives the largest image of the drawing, and is invaluable if you ever "get lost", or fail to see any drawing after opening an existing file. "Zoom limits" shows the drawing to the current limits, which can be changed, and "Zoom X" allows entry of a numeric factor – which may be greater or less than one. While drawing or changing, you often want to see an area in close-up, and "Zoom box" provides for this, by expanding a marked box to fill the screen (window). "Last view" reverses it. Both are also on function keys. While "Zoom box" can be repeated, "Last View" is literally true, and they are not "nested". "Redraw" leaves the view-point unchanged, but is used to update the screen display from the drawing data (in RAM), usually after changes.

Figure 6
Grey Scale printout using the standard dump routines.



"Break" removes a section of a line, arc, or curve, and can also be used to "trim" objects, by placing the second point beyond the unwanted end. When selecting Break points in a closed figure, going clockwise will remove one "arc", while going anti-clockwise will remove the other. However, even if you get it wrong, the position can be restored with "Undo".

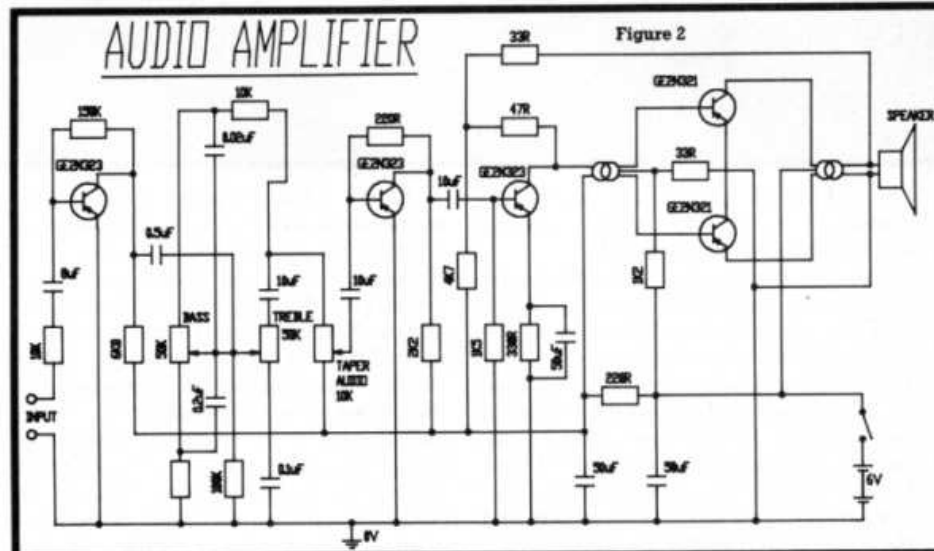
The name of the current drawing is



displayed at the bottom right, and is assigned when first saved. When saving, A.S. maintains not just the current drawing as an SKD file, but also the previous version as a BAK file (much as does WordStar). However, you have to quit A.S. to the "star" prompt, and rename the file from the BAK to the SKD directory, to make use of it. (By entering *EX, you can

If in A.S. you attempt to read the SKD files produced on a PC or Nimbus, (after

the standard 800K floppy disc is quite sufficient. However, the power of the program – especially on the Arc – is such that large and complex drawings could be created. These would probably incorporate many previous drawings as “parts”, for which only a hard disc could provide the necessary capacity. The price of the 20MB Hard Disc and Expansion Card for the Arc 300 Series is £573.85, inc VAT. An Expansion Backplane is also required. This has slots for two cards, and comes with a fan kit. It is priced at £44.85, inc VAT and includes fitting by your Acorn



The Audio Amplifier schematic was designed using Autosketch and printed using a plotmate plotter

moving them from DOS to ADFS), it returns "Drawing made on an incompatible machine". The drawing (SKD) files on the DOS version use 16-bit quantities, whereas those on the Arc version use 32-bit quantities. However, one of the options in the File menu is "Convert IBM". This allows A.S. to read DXF files written by the DOS versions of A.S., and so enable the transfer of drawings from a PC to the Arc. (I expect that future DOS versions of A.S. will also be able to read DXF files, so that they will be able to be passed in the other direction). To be recognized by A.S. DXF files must have the filetype &DEA. Those written by A.S. do so automatically, but those transferred from DOS require that it be done manually, with *SET-
TYPE <filename> &DEA. A suitable DOS-to-ADFS transfer utility is also required. Such utilities, called "PUTFILE", are included with the 80186 Co-Processor of the Master 512, and with the Arc PC Emulator.

I have already mentioned the benefits of a hard disc, when running PC/DOS software, in my article on the 440. (see A & B, 88/2, p 80). It becomes essential for certain applications, such as Desktop Publishing. A hard disc is also virtually essential for serious work when writing and debugging programs on the Arc in the major compiling languages.

For the majority of users,

dealer.

All models of the Arc support Modes 18 to 20, with 512 scan-lines, but they require a multi-frequency monitor to display them. With a modern unit, such as the NEC Multi-Sync or Taxan Multi-Vision 770 Plus, the switching is fully automatic and virtually silent, and when properly adjusted, the picture size and position remains the same. With a dot pitch of 0.31 mm instead of the 0.42 mm of the standard monitor, they also offer greater sharpness and legibility in all screen modes. When in Mode 20 therefore, A.S. drawings have the appearance of drafting pencil on cartridge paper, which makes working with the package an even greater pleasure. Indeed, such monitors help the potential of the Arc and applications such as A.S. (and an increasing number of others) to be realised to the full. Although such monitors are never cheap, they are widely discounted. As an indication, the Taxan 770 Plus has a list price of £803.85 inc VAT, but is available from Beebug at a members' price of £573.85 inc VAT.

With these additions, even the Arc 310 can become a personal workstation. Although this almost doubles the cost of a basic 310, the hard disc and multi-frequency monitor greatly increase its capability, while retaining your investment in the machine – in line with the Acorn tradition.

Even with a standard monitor, AS on the

Arc offers 640 x 256 x 16 colours, which is far better than CGA, with 640 x 200 x 2 colours, or 320 x 200 x 4 colours – as offered by the Amstrad PC 1512. Likewise, with a multi-frequency monitor, it offers 640 x 512 x 16 colours, which is more than EGA, with eg 640 x 350 x 16 colours – as offered by the Amstrad PC 1640 with EGD.

On a PC with 512 K of RAM, the DOS version of AS has some 115 K free for the drawing, while 640 K of RAM would give about 243 K. On the Arc 310, when using Mode 12, the Arc version has 272 K “by default”. Although this is already more than the DOS version, the much higher speed and disc capacity of the Arc means that larger drawings are practicable. I therefore used the program PC.PC – as included with version 1.20 of the Arc PC Emulator – to increase the RAM available within AS still further. It may be edited in the ARM Basic Editor, so you can change the modules that are “killed”, and the required screen and other “sizes” that are set temporarily. The configuration held in the non-volatile CMOS RAM is not affected. (This program may well be provided with – and already set up for – AS Arc). The RAM available in AS using Mode 12 was thus increased to 409 K. When using Mode 20, the version I had gave 272 K by default, but it should be possible to increase this to 409 – 80 = 329 K.

Performance

The re-draw times for the “amp” drawing (of 20 K) on the Arc are 9.4 s in Mode 12, and 11.4 s in Mode 20, and 46.3 s on the Amstrad PC 1512. Based on this and other results, the re-draw speed of the Arc version is some five times that of the DOS version running on an Amstrad PC – when neither are fitted with a hardware Floating Point Unit (FPU) or Maths Co-Processor. (With a very similar processor, and the same clock speed as the Amstrad, the Nimbus PC186 should have about the same performance).

AS Arc will take full advantage of an FPU but this cannot be fitted to a 310, and is not yet available for the 400 Series machines. When fitted with a Maths Co-Processor, the Amstrad runs about three times as fast, but is still slower than an Arc without. Although a hardware FPU is from 7 to 10 times as fast as a software Floating Point Emulator, the re-draw time depends also on the speed of screen drawing.

Output

Unless largely drawn “by eye”, the final quality of a drawing or graphic is dependent mainly on the output device. Save for the addition of the Plotmate plotters using the VDU language, AS Arc supports the same range of output devices as the DOS versions, including plotters up to A0 size, and LaserJet and Postscript laser printers. These are listed in the manual, together with their nominal paper sizes. The default sizes of the “plot boxes” are about the smallest found for the given devices, but

Table 2	2-D CAD	PACKAGE	FEATURES
Computer	B/Master	IBM-PC	Arc 310
CAD Package	Techsoft Designer	Pink TurboCAD	Autodesk AutoSketch
Price ex VAT	£ 235	£ 99	£ 79
Display Resolution	640 x 256	) Herc, CGA	640 x 256/512
Display Colours	2	) Olivetti, EGA	16
Precision – sig figs	5.5		7
Max Objects	15600	65536	2000 million
RAM Free Displayed	Disk based	in K	in K
Co-Ords Displayed Cont.	Y	Y	N
Key Control	Y and	Y and	N
Mouse Control	Y and	Y and	Y
Digitiser Pad Input	N	Y 5+	N
Zoom	Y	Y	Y
Pan	Y	Y	Y
Redraw	Y	Y	Y
Linear Grid	Y	Y	Y
Linear Lock/Snap	Y	Y	Y
Angle Lock/Snap	Ortho	Ortho	Ortho
Attach to Object	Y	Y	Y
Line Types	Up to 16	4 to 100	10
Line Widths	Pen Only	256	Pen plus Group
Line Colours	10	16	8
Layers	Y, as elements	128	10
Points	N	Y 17	Y
Lines	Y 3	Y	Y
Rubber Banding	Y	Y	Y
Boxes	N	Y	Y
Polygons	Y, as polyline	Y	Y
Tangent	Y 4	Y 4	N
Normal	Y	Y	N
Arcs	Y 9	Y 7	Y
Circles	Y 9	Y, as Arc	Y
Ellipses	Approx, 2	Approx	Spline only
Spline Curve	N	N	Y
Freehand Line	Y	Y	Spline only
Text	Y	Y	Y
Fonts	1, variable	5, variable	1, variable
Repeat Objects	Y	Y	N
Hatch Area	Y	Y	N
Dimensions	Y	Y	Y
Semi-auto Dimensions	Y	Y	Y
Align Dimensions	Y	Y	Y
Undo Last	Y	Y	Y
Undo Series	Y	N	Y
Redo	N	Y	Y
Change Property	Y	Y	Y
Window or Group Objects	Y	Y	Y
Open/Close Window	N	Y	Y
Stretch	N	Y	Y
Break/Trim Line, Arc	Y	Y	Y
Insert Parts	Y	Y	Y
Macros/Command Files	N	Y	N
DXF File Input	N	Y	Y
HPGL File Input	N	Y	N
Output to Scale	Y	Y	Y
Printer Output	Y 1	Y 5+	Y 7+
Plotter Output	Y 12+	Y 14+	Y 20+
HPGL File Output	N	Y	Y
DXF File Output	N	Y	Y

A table showing the relative speeds of the Arc up against BBC B and an IBM PC – note the price/performance ratio between the BBC B and the Archimedes!

some may be able to produce a larger plot. Hence, in the “Plot Area” dialogue box, you may enter larger (as well as smaller) dimensions, and even ignore any message about the plot box being too large for the configured printer or plotter, since the data is “clipped” by the output device, if necessary. This allows – eg multi-page plots on a graphics printer (fed with continuous paper) – though the temporary file might be very large!

Plotters

AS Arc includes drivers for plotters from Hewlett-Packard (using HPGL), Houston Instrument, and Linear Graphics Plotmate (using the VDU language), ranging

in size from A4 to A0, which can handle paper sizes up to 1117.6 x 863.6 mm. When configuring AS, you also have the option of writing a plot file (specific to a given plotter). This is stored in the PLT directory, and may then be plotted at another location or time, by entering eg *TYPE <filename> Ctrl-B, or *COPY <filename> PRINTER: on an Arc.

For testing purposes, I used a Plotmate A4SM, fitted with the HPGL emulation ROM, and a multi-pen attachment – as for my review of Lintrack (appearing in next month's issue). I tried it both using the VDU language, and emulating an H-P 7475. Unlike the Model B/Master, the Arc requires a “smart” or “M” version of the

Plotmate plotters – ie an A3M or A4SM. However, the “dumb” versions – A3 and A4S – may be fitted internally with an upgrade board. This is priced at £220 plus VAT for both plotters. An Archimedes “Welcome” Pack is also available, including a special Centronics lead, a Welcome disc, and a manual, for £42.66, plus VAT. As well as supporting the VDU language as standard, the Plotmate A3M and A4SM may be fitted with an emulation ROM to support the Hewlett-Packard Graphics Language (HPGL). The plotter may be used with either language manually, with pauses for pen changing, or automatically with a multi-pen attachment. This latter is priced at £132, plus VAT. Special prices are available to educational purchasers.

Most of the plots are courtesy of Autodesk – save for the house plan, which I drew for myself. This was plotted by the Plotmate A4SM, using the HPGL, with AS configured for an H-P 7475 plotter, in only 3 m 18 s. See Figure. 1. The “amp” drawing was plotted in 7 m 45 s. See Figure. 2. In its original form, the “jig” drawing used many close-dotted lines, which gave the plotter and pen a hard time, but when plotted, were indistinguishable from solid lines. However, using AS, it was a simple matter to change the line-type to solid throughout. It then took only 10 m 45 s to plot. See Figure. 1. The “siteplan” drawing took some 22 m to plot in five colours. See Figure. 4.

Printers

AS also supports graphics printers – Epson/IBM 9-pin, IBM Proprinter, Okidata, and TI Omni dot-matrix, and Hewlett-Packard LaserJet, and Postscript laser printers. For 80-column graphic printers, “Rotate 90 degrees” in the “Plot Area” dialogue box, needs to be set “On” to turn the plot “sideways” – from the “landscape” of the screen, to the “portrait” of the printer. When AS is configured for a graphics printer, it requires to write to a temporary file, to carry out the vector to raster conversion. The file is relatively large (eg 46 K), and the process takes a long time, but the results are remarkably good.

Slide Shows

AS Arc is eminently suitable for the creation of screen “slide shows”, using (AutoCAD) Slides for viewing from within AS, or Arc Sprites controlled eg from a Basic program. Since AS is an object-based drawing package, it is easy to scale the graphic before making a Slide or Sprite. Usually this would be done at constant aspect ratio, using eg “Zoom box”, or “Zoom full”, but “Scaling” also allows differential scaling in X and Y.

Documents

AS Arc drawings may also be saved as Sprites in Mode 12, (which reduces the resolution to that of the screen), and

loaded into eg Clares’ Artisan, for “clipping” to size, and adding area and pattern fills. (It may also be possible to use Welcome Paint for these purposes). By using the screen-to-printer “dumps” provided with Artisan, or the Artisan Support Disc, such Sprites may be output directly to a mono or colour graphics printer. With an ink-jet printer, such as the Integrex ColourJet 132, this may be onto paper or OHP film. See Figure. 5.

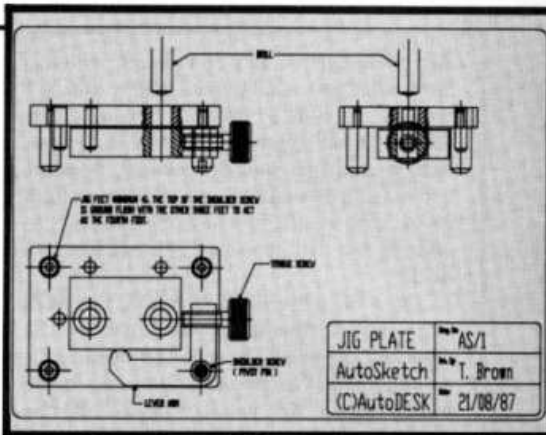
AS drawings may also be incorporated into documents as “line-art”, using desktop publishing packages, such as Ventura Publisher. VP is able to read Slide (SLD) files and HPGL plot files directly, and DXF files via a DXF-to-GEM conversion utility. (VP will run – albeit somewhat slowly – under the PC Emulator – although it does need a hard disc). Aldus Pagemaker also accepts HPGL plot files. Since these are all “object-based”, or “vector” formats, the resulting images have the full resolution of the printer (typically 300 by 300 dots per inch for a “page” or laser printer), rather than the much lower resolution of the screen (about 80 dpi horizontally, by 40 dpi vertically for Mode 12). There are excellent prospects of high-resolution printers – both mono and colour – at prices well below those of lasers in the near future. AS will be able to exploit them to the full.

Documentation

The manual is a very handy size, with just over 100 pages comprising tutorial and reference sections, with both contents and an index. A supplementary booklet will document the Archimedes-specific aspects, and another providing information for more advanced use is available on request.

Price and Availability

- *Autosketch* for the Archimedes will be priced at £79 plus VAT, and should be available shortly after this article appears.
- Techsoft Designer (TD) is a 2-D CAD package for the Model B/Master that is very well regarded in education and training, and is also used in small businesses. It runs even on a standard Model B (with DFS), and overcomes the memory limitations by holding the program in ROM, and the drawing file on disc (in a special format). It is the largest ROM-based application so far written for the Model B/Master, at 128 K. (Spellmaster is also 128 K, but contains mostly data, ie words). In effect, the ROM holds the program on a non-volatile, incorruptible RAM disc – and must account partly for the relatively high price.
- *Turbocad* (TC) is a 2-D CAD package for the IBM-PC and compatibles. Although low-priced, it is very fully featured, and runs fast. Indeed, TC runs remarkably well on the Arc, under the PC Emulator, and while the mouse response is somewhat sluggish, it is reasonably sensitive, and drawing and plotting are both entirely practicable.



Another plotmate dump with Autosketch

Conclusions

Autosketch running on the Arc is a powerful system for producing really “clean” drawings and graphics, with output as “slide shows”, to a plotter or graphics printer, or as files for incorporation in other documents. It is very easy to use, with control via menus and a mouse-driven pointer, on-screen prompting, and the keyboard (eg for accurate numeric input). As with text in a word processor, all the editing can be done on-screen before committing it to paper.

As an engineer, I found this to be a package of impressive power – especially at the price. It is ideal for preparing “structured graphics”, such as organization charts, and block diagrams, while – with its full numeric dimensioning capability – it is also excellent for floor-plans and site-plans. Although they are possible, it is less suited to bar-, line-, and pie-charts, and to mechanical drawings with complex geometry. However, it provides many of the features of a 2-D CAD package, for use in education and training, and the DXF drawing files can be read by AutoCAD.

The Arc version of AS is even better than the DOS versions, and runs on a 310 around five times as fast as on an Amstrad PC. The standard single floppy disc drive of 800 K provides ample storage capacity for both program and data.

At the same time, the Archimedes 300 Series can be equipped as a personal workstation by adding a high resolution, multi-frequency monitor, and now a 20 MB hard disc. It already has the ability to run PC/DOS software, (under the software PC Emulator), and can compile and run applications written in full-size, “main-frame” versions of the major languages. To the native-mode (32-bit) software for word processing, database, and spreadsheet, is now added *Autosketch* for computer aided drawing – which can make full use of both the multi-frequency monitor and the hard disc. This is thus an excellent package for showing what the 32-bit Arc can offer over the 16-bit competition. Also, it could well lead to full CAD packages appearing on the Arc.

Factfile

Autodesk are at : 90 London Road, London, SE1 6LN. ☎ (01) 928-7868.

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☐ I am certainly interested in AutoSketch but would appreciate more information (please tick).

	PRICE	VAT/ P+P	TOTAL	QUANTITY REQUIRED
AutoSketch	£79	12.54	91.54	☐

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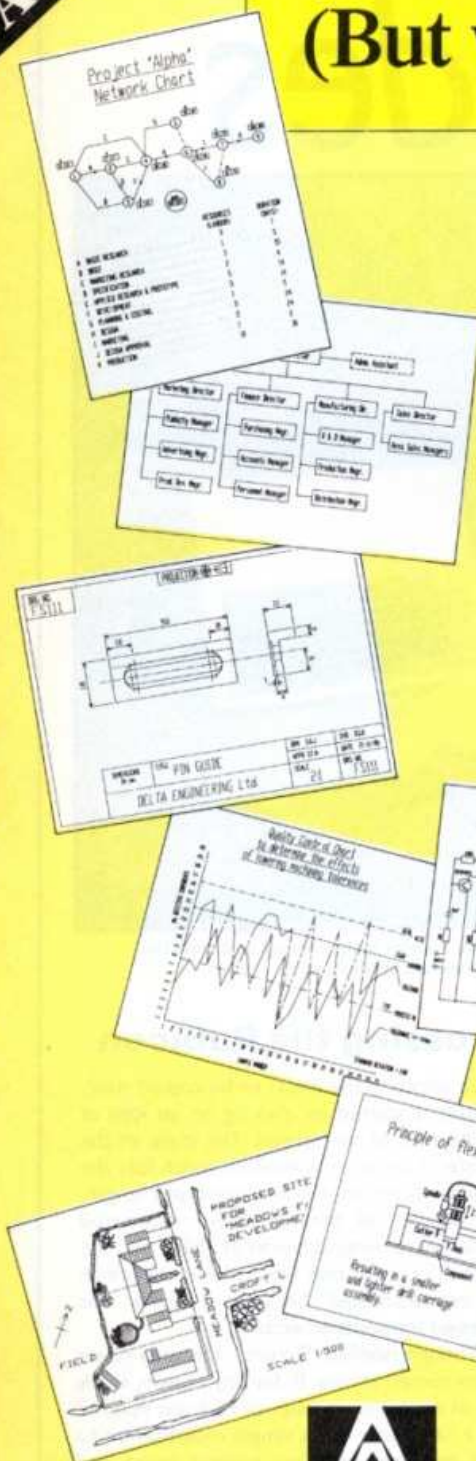
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LET'S TALK! Archimedes

Give your BBC programs a new lease of life with Archie! All you need is a transfer utility

If you have upgraded from a BBC Model B or Master to an Archimedes, there are probably some very useful programs that you wish to transfer to the new machine. The basic requirements are a lead to connect the two computers together, and two programs, one at each end, to get them to talk to one another. At one end of the scale these programs can be very simple (as short as four *FX commands), and several have appeared in user magazines. However, a good, ready-made WIMP-based utility can make it very easy to shift any mixture of file types in a single unattended operation.

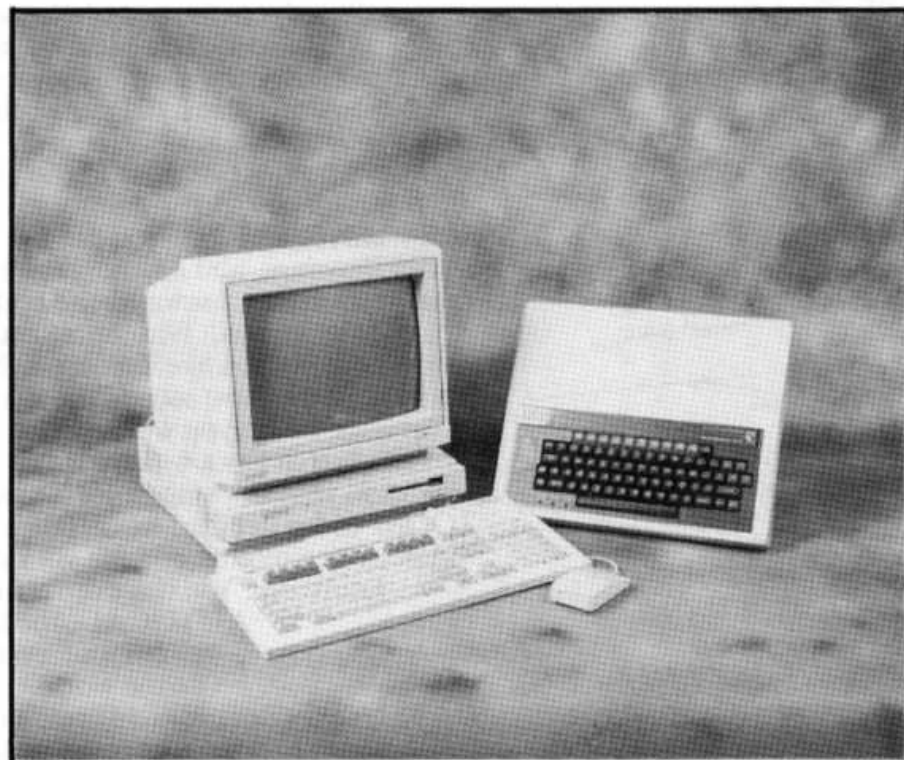
I have looked at two utilities – one from Beebug, and the other from Brainsoft. Both will work with all BBC computers, with DFS or ADFS, and both are very reasonably priced, especially Brainsoft's.

Beebug Serial Link

The Beebug kit contains the connecting lead, a 3.25 inch disc for the Archimedes and a four page instruction leaflet. The lead length of nearly 3m is particularly generous, and eases life considerably when the computers cannot be adjacent. The BBC machine is configured as a terminal for the Archimedes by issuing *FX7,6 and *FX2,1 commands. On booting the Archimedes disc, a title screen appears, and a control program is downloaded to the BBC machine, where it can be seen scrolling up the screen.

This program is sent at low speed (4800 baud), since it cannot be checked at this stage, and the link will not work if it is corrupted. Once installed, the program resets the serial link to its maximum speed of 19200 baud. The handshaking is then checked, and an error message appears if all is not well. The BBC program can be saved to disc after use, and reloaded when the utility is next used, which saves just a little time.

Possible problems include a poor cable connection, incorrect *FX calls on the BBC



One of the first major applications for the Archimedes was to transfer programs and data from the BBC Micro to the faster, friendlier, and more powerful architecture of the Arm.

machine, or data corruption during transfer. For example, the connector may have been inserted upside down at the BBC end, which is all too easy to do. Data corruption may be due to interference of some kind, which is not common, or to bugs in the Archimedes serial port, which are, and for which software fixes are available.

One source of much confusion is that the connections to pins 6 and 8 on the Archimedes should be interchanged if using OS 1.2 with certain serial interface chips, which appear to include those made by GTEMicro. Beebug can supply a suitable cable, and their latest software (version 1.3) checks for the OS version number and loads a fix where appropriate.

All file transfers are controlled from the Archimedes screen, using the mouse. The screen is split vertically into two windows, containing the respective file catalogues, and detailed information can be obtained on any file by "clicking" on it using the third mouse button. The source of the file to be transferred is the BBC machine by default, but can be changed merely by selecting one of the Arc files as the source. The currently selected catalogue is shown by a green highlight in the top border.

Crossing the Rubicon

After selecting the file(s) to be copied over, transfer is started by clicking on an icon at the bottom of the screen. The state of the transfer is shown in a window which lists the transfer direction, the file name and length, the number of bytes already transmitted (which increments in blocks of 1024), and the number of times that blocks have needed to be re-transmitted because a check has revealed transmission errors.

Though labelled "Errors", this only refers to corrected errors. If, for any reason, there are an excessive number of re-tries, you can call a halt, carry out a simple modification to both programs to select a lower speed, and start again. On completion the receiving disc is automatically re-catalogued.

Other icons in the footing band allow you to move back one directory or directly to the root directory if you are in the ADFS, and to catalogue the disc on the selected computer – this last operation is necessary if the disc at either end is changed. There is also a STOP icon to terminate the link, which demands confirmation. If you confirm by mistake, each computer can be restarted by typing RUN.

There is provision to boot the Archimedes program without transmitting the BBC one (eg when the latter has been loaded off disc), and you can exit from the Archimedes (temporarily or indefinitely) while leaving the BBC machine running.

All files are transferred into the current directory with the original directory letter stripped off, and an overwrite warning is issued if the filename already exists. It is a simple matter to select files in groups, and to select the appropriate directory for each group at the receiving end. Any necessary filing system operations are carried out using OS commands, which can be directed to either computer. These appear in a large, blank window, with the '*' prompt prefaced by 'A' or 'B' to remind the user which computer is being addressed. Pressing <RETURN> at any prompt removes the window.

This handy utility is delightfully simple to use, and worked excellently. The software proved very robust, and well error trapped – it was never necessary to re-boot and start again. It is so friendly that the instructions are hardly necessary except for setting up the link initially. It has been in use for some weeks, during which many programs of all types, ranging in length from a few bytes to 25K, have been transferred in both directions with few re-tries.

Brainsoft Desktop + Transfer Software

The Brainsoft interface kit contains a disc for each computer, and an RS423 lead 1m long – Brainsoft say that this is to minimise glitches caused by electrical interference. The software is more extensive than Beebug's, because it also embodies an alternative desktop. In addition to the interface software this offers a palette, notepad, clock, calculator, and an optional editor. The latter is provided for editing compiler source code, stored in command and text files. It is only available on the 310 and the 400 series, which most compilers would need to use anyway. It can of course be used for BASIC programs or text files.

The calendar, notepad and palette in the version reviewed appear to be the same as Archie's, but some extensions to these are proposed. The clock sprite takes the form of Big Ben. The calculator has more functions than Archie's, including numerical powers and roots, logarithms (natural and base 10) and the trigonometrical functions sin cos & tan with their inverse, all angles being expressed in radians. The calculator cannot be accessed from the keyboard. It effectively adds two useful extensions to the editor, providing denary (decimal), binary and hexadecimal inter-conversion, and the ability to transfer the contents of the calculator display into the editor.

Within the editor window an icon-style menu is available. It shows the percentage of the text buffer occupied by text, and below this the number of lines. It is possible to highlight any contiguous portion of the text,

in which case the number of lines applies to the highlighted area. The rest of the menu has eight icons, for loading and saving text, finding, replacing, printing or deleting strings, and numbering the text to aid editing. Where appropriate the commands can operate either on highlighted strings or on the whole text. A merge icon adds a text file to the bottom of the text buffer. The keyboard is used to copy a highlighted text to a new position, or to delete it, and to indent text.

Double-glazing?

An unusual feature of the editor is the ability to open a second text window independently of the first. The menu icon can be accessed from within the second window, and all its options will then apply to the text in that window. It is also possible to use the mouse to delete or insert bits of text, down to single letters, and text can be transferred in either direction between the two windows. This facility is very useful, allowing continuous comparison of amended text with the original, and providing a degree of backup.

The transfer software will copy any file from the BBC to the Archimedes within the WIMP environment, but not vice versa.

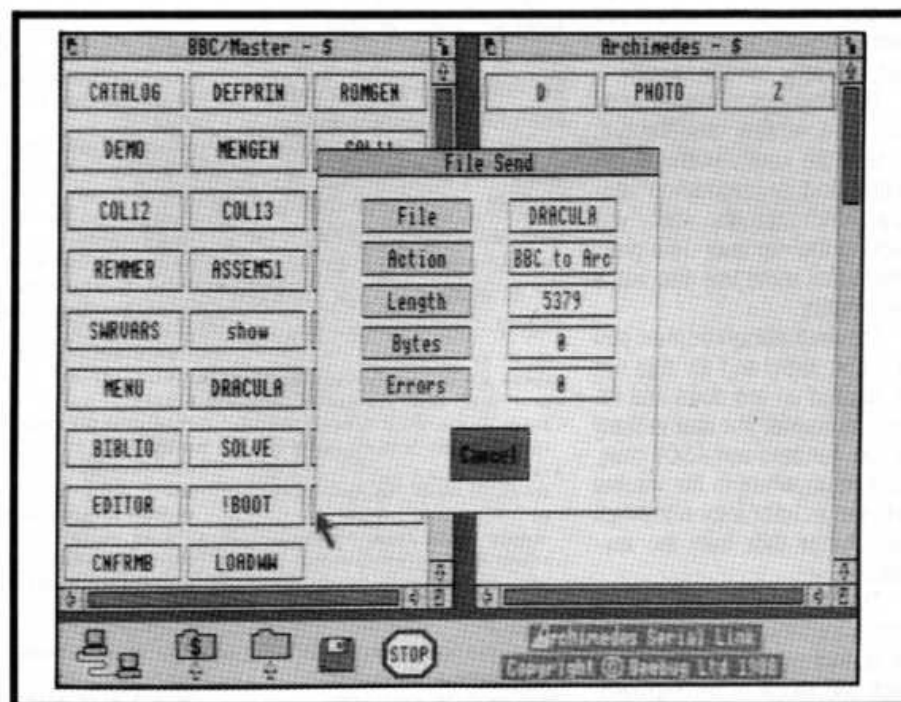
However, when a group of files was selected for transfer, only one or two files (at most three) could be transferred before a crash, and the "wrong" lead appeared to work better than the "correct" one, though the difference was small. More often than not both computers had to be re-booted after a successful transfer, and always after a failure, despite apparently good error trapping.

"Load" is selected to start the transfer. There is no file overwrite warning, but each file is locked after transmission to prevent this. However, you should check both discs for any filename duplication before you start. The name of the file being transferred can be seen on the BBC screen, but you are not otherwise informed of progress, completion being signalled by the disappearance of the menu.

After the transfer another menu option will reveal how many re-tries were needed, should you be interested. A byte-wise error check is used, which reduces the speed, but is a belt and braces defence against errors. To be sure that a file has been received you must remove the existing Arc window and re-catalogue.

Conclusions

If you simply want a utility to transfer files, singly or in groups, in either direction, then I can thoroughly recommend the Beebug version, which is simple, informative, robust, works in either direction and is a pleasure to use. If you want an alternative desktop with a file transfer capability and the option of adding an editor, as detailed above, with some likely future enhancements, then you will wish to consider the Brainsoft version. You should be able to assume that the transfer software will work properly, bearing in mind that the review problem could well be restricted to certain Archimedes machines only, and that Brainsoft should, in any case, have the answer by the time you read this.



The actual procedure for using the transfer facility is straightforward. The two discs can be catalogued, and their contents appear in two overlapped windows which the user can move and open up to taste. After selecting the appropriate file(s), the mouse "menu" button reveals an option list, from which

Factfile

Beebug Serial Link, complete: £18.16 inclusive, from BEEBUG, Dolphin Place, Holywell Hill, St. Albans, Herts. AL1 1EX ☎ 0727 40303 Brainsoft Desktop Plus: Software and connecting lead £14, software only £8.00, plus £5.00 for editor (optional extra) in each case. All prices inclusive. Available from Brainsoft, 22 Baker Street, London W1M 1DF.



ARCEditor

Disk Editor

This powerful utility provides a mouse driven interface straight to the surface of your Arc discs.

Disk Editing

Use the Disk Editor with care! Don't use it on any discs which you have not backed up. Although the disc editor always asks if you want to change anything on your disc, accidents can still happen!

The disc editor display consists of a window onto the disc surface, the control icons at the bottom and an information window which appears when you click on the info icon. This gives information about free disc space and memory.

The main window displays part of a disc sector and the data can be scrolled up and down and the window resized. The data is shown as hex numbers and ASCII code. Clicking anywhere in the window activates an edit cursor with which you change data from the keyboard.

The head, track and sector icons select the current head (top or bottom surface of the disc), track and sector to be displayed. Clicking on the icons with the left button moves forward through the sectors and with the right button back through them. The head just changes back and forth between 1 and 2.

The middle mouse button brings up a separate menu which

provides options to save disc based data to memory or to swap data around on the disc. No change is actually made to the data on disc without your confirmation. A prompt appears whenever you move on from a sector which has been changed or choose to exit the disc editor.

The left button is used to highlight areas of data in the window display and it is the highlighted data which is operated on by the menu commands.

Don't forget to use the BASIC editor (*ARMBE) to type in the program. It's so much easier! Once saved you will be able to run the disc editor simply by clicking on its icon from your desktop display.

```
10REM >DiscEdit
20REM A disc sector editor
for floppy disc systems
30REM for Archie posters only
40REM by Keith McAlpine & Gem
Electronics
50REM (C)1988 A&B Computing
60
70MODE 12:ON ERROR PROCError
80PROCcolours:PROCsetUDGs
90memsize%=HIMEM-(LOMEM+2000
0)
100DIM
line$(66),marky%(2),block
&600,frame 12,discmem%
&410,membuf% memsize%
110FOR lp%=0 TO
11:fname?lp%=0:NEXT
120memstart%=membuf%:memend%
membuf%:close_down=FALSE
130FOR lp%=0 TO
66:line$(lp%)=STRING$(80,"?"):
NEXT
140marky%{}=65:sector_changed
%=FALSE:enter_filename%=FALSE
150sector%=0:track%=0:floppy%
```

```
=-1:search$="*****":head%
=0
160current%=0:hex$="":marker%
=-1:line%=-1:liney%=0
170SYS "Wimp_Initialise":SYS
"Wimp_ForceRedraw",-1,0,0,1279
,1023
180DIM
window%(5),window$(5),iconlist
%(10):*POINTER
190PROCinit_panel:PROCget_flo
ppy_type
200REPEAT:PROCCaction(FNpoll(0
)):UNTIL close_down
210IF sector_changed% THEN
PROCCsector_changed
220SYS "Wimp_CloseDown":MODE
12:PRINT"Finished.":END
230
240DEF PROCcolours
250black=0:red=1:green=2:yellow=3:blue=4:magenta=5:cyan=6:white=7
260orange=15:scrollbarfgcol=1
4:scrollbarbgcol=8:highlightbgcol=red
270titlefgcol=12:titlebgcol=s
crollbarfgcol
280VDU19,15,16,0,0,240,19,14,
16,240,176,96
290VDU19,13,16,255,0,0,19,12,
16,0,0,128
300VDU19,11,16:VDU19,10,16:
VDU19,9,16:VDU
19,8,16,0,192,240
310ENDPROC
320
330DEFPROCcreate(title$,flags%,
fgcol%,bgcol%,maxx%,maxy%,lx%,b
x%,rx%,tx%)
340window$(windowindex%)+=titl
e$:windowindex%+=1
350block!0=1%:block!4=b%:bloc
k!8=r%:block!12=t%:block!16=0
360block!20=maxx%:block!24=-1
:block!28=flags%:block!32=titl
efgcol
370block!33=titlebgcol:block!
34=fgcol%:block!35=bgcol%
380block!36=scrollbarbgcol:b
lock!37=scrollbarfgcol
390block!38=highlightbgcol:b
lock!39=0:block!40=0:block!44=0
400block!48=maxx%:block!52=ma
xy%:block!56=2D:block!60=300
0
410$(block+72)=LEFT$(title$,1
1):block!84=0
420SYS
"Wimp_CreateWindow",0,block TO
handle%
430=handle%
440
450DEFPROCupdatewindow(handle
%,lx%,bx%,rx%,tx%)
460block!0=handle%:block!4=1%
:block!8=b%:block!12=r%:block!
16=t%
470SYS
"Wimp_UpdateWindow",0,block TO
more%
480SYS"Wimp_GetWindowState",0
,block:ENDPROC
490
500DEFPROCopenwindow(handle%,
full%,front%)
510block!0=handle%
520IF NOT full% THEN:SYS
"Wimp_GetWindowState",0,block
530IF front% THEN block!28=-1
540SYS
"Wimp_OpenWindow",0,block:ENDP
ROC
550
560DEF
PROCCclosewindow(handle%)
570block!0=handle%:SYS
"Wimp_CloseWindow",0,block:END
PROC
580
590DEF FNpoll(mask%):SYS
"Wimp_Poll",mask%,block TO
a%:=a%
600
610DEF PROCCaction(evtnt%)
620CASE evtnt% OF
630WHEN 1:
PROCCredrawwindow(block!0)
640WHEN
2:PROCCopenwindow(block!0,TRUE,
0)
650WHEN 3:
PROCCclosewindow(block!0):windo
w%(FNwhichwindow(block!0))=-1
660WHEN 6:
PROCCcheckmouse(!block,block!4,
block!8,block!12,block!16,bloc
k!20)
670WHEN 8: PROCCkeypress
680WHEN 9:
void=EVAL("FNmenu_"+claimenu$
+"(block!0)")
690ENDCASE:ENDPROC
700
710DEF
PROCCredrawwindow(handle%)
720lx%=FNwhichwindow(handle%):
name$=window$(lx%)
730block!0=handle%:SYS
"Wimp_RedrawWindow",0,block TO
more%
740PROCLwaorigin(block!4,x0%,
y0%)
750WHILE more%
760junk=EVAL("FNdraw_"+name$+
"({x0%,y0%}")
770SYS
"Wimp_GetRectangle",0,block TO
more%
780ENDWHILE:ENDPROC
790
800DEF PROCLwaorigin(b,RETURN
x%,RETURN y%)
810x%=b!0-b!16:y%=b!12-b!20:E
NDPROC
820
830DEF FNwhichwindow(handle%)
840this%=-1:FOR ix%=1 TO 5:IF
window%(ix%)=handle% THEN
this%=ix
850NEXT ix%:=this%
860
870DEFPROCcreateicon(handle%,
lx%,bx%,rx%,tx%,flags%,fgcol%,bgco
l%,data$)
880block!0=handle%:block!4=1%
:block!8=b%:block!12=r%:block!
16=t%
890block!20=flags%:block!23=(
fgcol% AND &F)+(bgcol%<<4)
900$(block+24)=data$:SYS
"Wimp_CreateIcon",0,block:ENDP
ROC
910
920DEF PROCError
930MODE 12:PRINT REPORT$:" @
line ":",ERL
940PRINT"if there is unsaved
data stored in memory use:"
950PRINT"SAVE <filename>"
";memstart%:"
";memend%:*FX4,0
960END
970
```


ARCHIMÉDES LISTING

```

980DEF PROCsetUDGs
990FOR I%=218 TO 254:VDU
23,I%:FOR I2%=1 TO 8:READ
data%:VDU data%:NEXT,
1000back$=CHR$(10)+STRING$(3,
CHR$(8))
1010head$=CHR$(218)+CHR$(219)
+CHR$(220)+back$+CHR$(221)+CHR
$(222)+CHR$(223)
1020x1t$=CHR$(224)+CHR$(225)
+CHR$(226)+back$+CHR$(227)+CHR
$(228)+CHR$(229)
1030info$=CHR$(230)+CHR$(231)
+CHR$(232)+back$+CHR$(233)+CHR
$(234)+CHR$(235)
1040disc$=CHR$(236)+CHR$(237)
+CHR$(238)+back$+CHR$(239)+CHR
$(240)+CHR$(241)
1050sect$=CHR$(242)+CHR$(243)
+CHR$(244)+back$+CHR$(245)+CHR
$(246)+CHR$(247)
1060trak$=CHR$(248)+CHR$(249)
+CHR$(250)+back$+CHR$(251)+CHR
$(252)+CHR$(253)
1070
1080DATA255,128,129,252,0,205
,205,205,24,126,255,24,0,243,1
34,134
1090DATA255,1,129,63,0,156,21
9,219,253,205,205,0,252,129,12
8,255
1100DATA231,134,246,0,24,255,
126,24,219,219,223,0,63,129,1,
255
1110DATA127,192,220,206,220,2
08,220,192,255,0,0,0,160,160,6
4,167,254,3,3,3
1120DATA3,3,3,3,192,192,192,1
92,192,192,192,127,162,2,2,7,0
,0,0,255,3,59
1130DATA19,19,19,19,3,254,127
,192,192,192,192,192,192,2
55,0,3,4,4,3,56
1140DATA68,254,3,131,67,67,13
1,3,3,192,193,194,194,194,193,
192,127,136,16
1150DATA39,57,6,248,0,255,3,3
,3,3,3,3,254,127,205,202,205
,202,205,199
1160DATA192,255,88,168,88,175
,85,255,0,248,108,102,99,227,9
9,195,3,199
1170DATA204,204,204,204,204,2
04,127,255,0,200,0,180,0,107,2
55,227,51,179
1180DATA51,179,51,51,254,255,
128,129,252,0,238,136,236,24,1
26,255,24,0,238
1190DATA
132,132,255,1,129,63,0,238
1200DATA169,169,40,40,238,0,2
52,129,128,255,132,132,228,0,2
4,255,126,24
1210DATA174,169,233,0,63,129,
1,255,255,128,129,252,0,119,36
,36,24,126,255
1220DATA24,0,24,165,165,255,1
,129,63,0,201,42,12,39,36,36,0
,252,129,128
1230DATA255,61,165,164,0,24,2
55,126,24,10,41,201,0,63,129,1
,255
1240DATA255,255,255,255,255,2
55,255,255
1250ENDPROC
1260
1270DEF
FNdraw_panel(x0%,y0%)
1280GCOL black: MOVE 1200,80:
PRINT exit$:MOVE 1120,80:
PRINT info$
1290MOVE 1040,80: PRINT
sect$: MOVE 960,80: PRINT
head$
1300MOVE 880,80: PRINT
trak$:GCOL yellow: PLOT
133,1124,70
1310GCOL red: PLOT
133,1140,44: PLOT 133,1148,36:
PLOT 133,1148,64
1320GCOL cyan: PLOT
133,1210,30:GCOL magenta
1330FOR I%=80 TO 68 STEP -4
1340PLOT 77,1050,I%: PLOT
77,1080,I%:PLOT 77,970,I%:
PLOT 77,1000,I%
1350PLOT 77,890,I%: PLOT
77,920,I%:PLOT 77,1050,I%-48:
PLOT 77,1080,I%-48
1360PLOT 77,970,I%-48: PLOT
77,1000,I%-48:PLOT
77,890,I%-48: PLOT
77,920,I%-48
1370NEXT I%
1380MOVE 32,80:GCOL
black:PRINT disc$:GCOL white
1390RECTANGLE FILL
408,44,464,-32
1400GCOL blue: MOVE
444,84:PRINT "EDITING"
1410MOVE 308,44: PRINT "Track:
Head: Sector: "
1420MOVE 404,44:PRINT
STR$(track%):MOVE 548,44:PRINT
STR$(head%)
1430MOVE 708,44:PRINT
STR$(sector%):=0
1440
1450DEF PROCinit_panel
1460windowindex%=1
1470window$(1)=FNcreate("pane
1",840,black,white,1280,96,2,4
,1278,92)
1480iconindex%=0
1490PROCcreateicon(window$(1)
,28,20,74,84,&3000,white,blue,
"-")
1500window$(2)=FNcreate("Flop
py0",80F,blue,cyan,1280,2560,0
,616,1279,936)
1510iconlist$(iconindex%)=win
dow$(2):iconindex%+=1
1520PROCcreateicon(window$(1)
,956,20,1002,84,&3000,white,bl
ue,"")
1530iconlist$(iconindex%)=win
dow$(2):iconindex%+=1
1540PROCcreateicon(window$(1)
,1036,20,1082,84,&3000,white,b
lue,"")
1550iconlist$(iconindex%)=win
dow$(2):iconindex%+=1
1560PROCcreateicon(window$(1)
,1116,20,1162,84,&3000,white,b
lue,"")
1570window$(3)=FNcreate("Info
rmation",83,yellow,magenta,640
,280,628,736,1288,1016)
1580iconlist$(iconindex%)=win
dow$(3):iconindex%+=1
1590PROCcreateicon(window$(1)
,876,20,922,84,&3000,white,blu
e,"")
1600iconlist$(iconindex%)=win
dow$(2):iconindex%+=1
1610PROCcreateicon(window$(1)
,1196,20,1242,84,&3000,white,b
lue,"")
1620iconlist$(iconindex%)=win
dow$(2):iconindex%+=1
1630window$(4)=FNcreate("",85
0,black,white,640,320,320,500,
960,820)
1640iconlist$(iconindex%)=win
dow$(4):iconindex%+=1
1650PROCopenwindow(window$(1)
,FALSE,-1):PROCopenwindow(wind
ow$(2),FALSE,-1)
1660ENDPROC
1670
1680DEF
PROCcheckmouse(mousex%,mousey%
,button%,handle%,icon%,ob%)
1690IF handle%=-1 THEN
ENDPROC
1700num%=FNwhichwindow(handle
%)
1710!block=handle%:SYS
"Wimp_GetWindowState",0,block
1720IF handle%=window$(1) AND
icon%<-1 THEN
1730CASE TRUE OF
1740WHEN (button% AND 4)=4
AND
icon%=0:PROCplacewindow(0,2)
1750WHEN (button% AND 4)=4
AND icon%=1:
PROCchange(0,1,0,1,1)
1760WHEN (button% AND 1)=1
AND icon%=1:
PROCchange(0,-1,0,1,1)
1770WHEN (button% AND 4)=4
AND icon%=2:
PROCchange(1,0,0,3,5)
1780WHEN (button% AND 1)=1
AND icon%=2:
PROCchange(-1,0,0,3,5)
1790WHEN (button% AND 4)=4
AND icon%=3:
PROCplacewindow(3,3)
1800WHEN (button% AND 4)=4
AND icon%=4:
PROCchange(0,0,1,10,25)
1810WHEN (button% AND 1)=1
AND icon%=4:
PROCchange(0,0,-1,10,25)
1820WHEN icon%=5:
VDU7:close_down=TRUE
1830ENDCASE
1840ELSE
1850IF num%=2 THEN
1860CASE TRUE OF
1870WHEN (button% AND 4)=4:
PROCedit_sector
1880WHEN (button% AND 1)=1:
PROCmarker
1890WHEN (button% AND 2)=2:
PROCmenu
1900ENDCASE
1910ELSE
1920ENDIF
1930ENDPROC
1940
1950DEF
PROCplacewindow(icon%,num%)
1960handle%=iconlist$(icon%):
window$(num%)=handle%
1970IF num%=2 THEN
current%=0:PROCget_floppy_type
1980PROCopenwindow(handle%,FA
LSE,-1)
1990SYS
"Wimp_ForceRedraw",-1,0,128,12
79,1024
2000ENDPROC
2010
2020DEF PROCread_sector
2030line$="undefined"
2040IF floppy%=640 THEN
2050disc_addr%=((track%*2+hea
d%)*16+sector%)*256:length%=25
6
2060FOR lp%=16 TO
64:line$(lp%)="null":NEXT
2070ELSE
2080disc_addr%=((track%*2+hea
d%)*5+sector%)*1024:length%=10
24:line$(64)="null"
2090ENDIF
2100disc_addr%=(0<<29):SYS
"ADFS_DiscOp",0,1,disc_addr%,d
iscmem%,length%
2110sector_changed%=FALSE:END
PROC
2120
2130DEF PROCinto_array(1%)
2140chr$="":byte$="":FOR
lp2%=0 TO
15:byte%=?((discmem%+(1%*16)+1
p2%))
2150byte$=byte$+FNnum(byte%,2
)+ " "
2160IF byte%<32 OR byte%>126
THEN chr$+=". " ELSE
chr$+=CHR$(byte%)
2170NEXT lp2:line$(1%)=">>>
"+byte$+" "+chr$+"
<<<":ENDPROC
2180
2190DEF PROCget_floppy_type
2200LOCAL ERROR
2210ON ERROR LOCAL :RESTORE
ERROR:ERROR 1,"ADFS ERROR:
There is no disc in drive
"+STR$(current%)+".":ENDPROC
2220SYS
"ADFS_DiscOp",0,1,(0<<29),disc
mem%,1024
2230IF discmem%:513=&6F77548
THEN floppy%=640 ELSE
floppy%=800
2240IF floppy%=800 AND
sector%>4 THEN sector%=0
2250RESTORE ERROR
2260PROCread_sector
2270IF floppy%=640 THEN
num_sector%=16 ELSE num_sector%=5
2280ENDPROC
2290
2300DEF
FNdraw_Floppy0(x0%,y0%)
2310PROCcliprect(b,block+4,x1%,
y1%,x2%,y2%):a%=(2560-12-y2%)
DIV 40+1
2320b%=(2560-12-y1%) DIV
40+2:FOR I%=a% TO b%
2330IF I%>marky%(0) AND
I%<marky%(1) THEN GCOL 4 ELSE
GCOL 11
2340IF I%>marky%(2) AND
I%<marky%(2)+marky%(1)-marky%
(0) THEN GCOL 1
2350MOVE
x0%+4,y0%+2560-12-40*(I%-1)
2360IF
line$(I%-1)="undefined"
PROCinto_array(I%-1)
2370IF line$(I%-1)<>"null"
PRINT line$(I%-1):
2380NEXT:=0
2390
2400DEF FNnum(loc%,count%)
2410IF loc%>255 THEN loc%=0
2420num$=STR$(loc%:num$=STRIN
G$(count%-LEN(num$),"0")+num$:
=num$
2430
2440DEF PROCcliprect(b,RETURN
x1%,RETURN y1%,RETURN
x2%,RETURN y2%)
2450LOCAL x0%,y0%
2460PROC!waorigin(b,x0%,y0%):
x1%=b!24-x0%:y1%=b!28-y0%:x2%
=b!32-x0%
2470y2%=b!36-y0%:ENDPROC
2480
2490DEF
PROCchange(sect%,hd%,trak%,step

```


ARCHIMÉDES LISTING

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1%,step2%)
2500IF sector_changed% THEN
PROCsector_changed
2510step%:=1:IF INKEY-1 THEN
step%:=step1% ELSE IF INKEY-2
THEN step%:=step2%
2520sector%:=(step%*sect%):IF
sector%<0 THEN
sector%:=num_sect%-1:hd%=-1
2530IF sector%>num_sect%
THEN sector%:=0:hd%=1
2540head%:=(hd%*step%):IF
head%<0 THEN head%:=1:trk%=-1
2550IF head%>1 THEN
head%:=0:trk%=1
2560track%:=(trk%*step%):IF
track%<0 THEN track%:=79
2570IF track%>79 THEN
track%:=0
2580PROCupdatewindow(window%(
1),308,0,774,52):PROCread_sect
or
2590PROCupdatewindow(window%(
2),0,0,1279,2560):ENDPROC
2600
2610DEF
FNdraw_information(x%,y%)
2620x%:=block14:y%:=block16-8
2630MOVE x%,y%:PRINT " DISC
SECTOR EDITOR by Keith
McAlpine"
2640MOVE x%,y%-32:PRINT
"(C)1988 Gem Electronics + A&B
Computing."
2650MOVE x%,y%-96:PRINT "
Editing the floppy disc in
drive ";current%
2660MOVE x%+192,y%-128:PRINT
" Disc type:";floppy%:"K
":MOVE x%,y%-160
2670SYS "ADFS_FreeSpace","0"
TO total%,largest%
2680PRINT " Total
free:";total%/1024;"K
Largest
free:";largest%/1024;"K"
2690MOVE x%,y%-212:PRINT
Memory size:";memsize% DIV
1024;
2700PRINT;"K Memory
left:";(memsize%-(memend%-mems
tart%)) DIV 1024;"K":=0
2710
2720DEF PROCedit_sector
2730PROCget_cursorpos(linex%,
liney%):MOUSE mx%,my%,bu%
2740linex%:=(2572-block124)
DIV 40)+((block16-my%) DIV
40)
2750linex%:=(block120 DIV
16)+((mx%-block14) DIV 16)
2760IF linex%>71 OR linex%<5
OR (linex%>52 AND linex%<56)
THEN VDU7:ENDPROC
2770IF linex%>55 THEN
2780edit$="text"
2790ELSE
2800edit$="hex":linex%:=(lin
ex%-8) MOD3
2810ENDIF
2820hex$="":*FX15,0
2830PROCcursor(window%(2)):EN
DPROC
2840
2850DEF PROCcursor(wind%)
2860y%:=2560-40*(liney%+1):x%:=
4+16*(linex%)
2870SYS
"Wimp_SetCaretPosition",wind%,
-1,x%,y%,&1000000 OR
36,-1:ENDPROC
2880
2890DEF
PROCget_cursorpos(RETURN
1x%,RETURN 1y%)
2900MOUSE mx%,my%,bu%
2910ly%:=(2572-block124) DIV
40)+((block16-my%) DIV 40)
2920lx%:=(block120 DIV
16)+((mx%-block14) DIV 16)
2930ENDPROC
2940
2950DEF PROCkeypress
2960IF enter_filename% THEN
PROCcentered:ENDPROC
2970num%:=FNwhichwindow(block:
0):char%:=block124:ed$=line$(li
ney%)
2980IF edit$="text" THEN
2990line2x%:=(linex%-56)*3+5
3000line$(liney%):=FNmerge(ed$
,CHR$(char%),FNnum(char%,2))
3010PROCupdatewindow(window%(
2),linex%+16,2560-40*(liney%+
1),(line2x%+16)+20,2560-40*(li
ney%))
3020PROCupdatewindow(window%(
2),line2x%+16,2560-40*(liney%+
1),(line2x%+16)+36,2560-40*(li
ney%))
3030linex%:=1:IF linex%>71
linex%:=56:liney%+=1
3040IF liney%>63
liney%:=63:linex%:=71
3050ELSE
3060IF char%<48 OR char%>70
OR (char%>57 AND char%<65)
THEN VDU7:ENDPROC
3070line2x%:=linex%:linex%:=(li
ne2x%-5)
DIV3)+56:hex$:=CHR$(char%)
3080hex$:=EVAL("&"+hex$):line$
(liney%):=FNmerge(ed$,CHR$(hex%
),FNnum(hex%,2))
3090PROCupdatewindow(window%(
2),linex%+16,2560-40*(liney%+
1),(line2x%+16)+20,2560-40*(li
ney%))
3100PROCupdatewindow(window%(
2),line2x%+16,2560-40*(liney%+
1),(line2x%+16)+36,2560-40*(li
ney%))
3110IF LEN(hex$)=2
hex$="":line2x%+=3:IF
line2x%>50
line2x%:=5:liney%+=1
3120IF liney%>63
liney%:=63:linex%:=71
3130linex%:=line2x%
3140ENDIF
3150PROCcursor(window%(2)):se
ctor_changed%=TRUE:ENDPROC
3160
3170DEFNmerge(str$,textchr$,
hexchr$)
3180?(discmem%+(linex%+16)+li
nex%-56):=ASC(textchr$)
3190IF ASC(textchr%)<32 OR
ASC(textchr%)>126 THEN
textchr$="."
3200str$=LEFT$(str$,linex%)+t
extchr$+RIGHT$(str$,LEN(str$)-
linex%-1)
3210str$=LEFT$(str$,line2x%)+
hexchr$+RIGHT$(str$,LEN(str$)-
line2x%-2)
3220=STR$
3230
3240DEF PROCmarker
3250marker%:=1:IF marker%>2
THEN VDU 7:ENDPROC
3260PROCget_cursorpos(marker%,
marky%):marky%:(marker%):=marky%
+1
3270IF marker%=0 THEN
marky%:(marker%+1):=65
3280SYS
"Wimp_ForceRedraw",window%(2),
0,block124-block116,1280,block
124
3290ENDPROC
3300
3310DEF PROCmenu
3320RESTORE 3430:MOUSE
mx%,my%,bu%:block%:=&100:$block
="Menu: Disc 0"
3330block12:=&01070300:block1
16:=420:block120:=40:block124:=10
3340ptr:=block+28:FOR items%=1
TO 6:READ data$
3350$(ptr+&300+(items%*6)):=da
ta$+CHR$(13):ptr:=ptr+4:=--1
3360ptr:=&010121 OR 1<<28 OR
7<<24
3370IF items%=1 AND
marky%(2)=65 THEN ptr:=ptr+8
OR &400000
3380IF items%<>3 AND
items%<>5 AND
marky%(0)=65:ptr:=ptr+8 OR
&400000
3390ptr:=ptr+&300+(items%*6
):ptr:=ptr-1:ptr:=ptr+24
3400NEXT
items%:ptr:=ptr-24:=&80:SYS
"Wimp_CreateMenu",0,block,mx%,
my%
3410block%:=&100:claimenu$="m
arkers":menu_num%=2
3420
3430DATA Copy blue area to
red area,Save blue area to
memory
3440DATA Save memory as a
file,Blank blue area,Reset
Memory,Wipe markers
3450ENDPROC
3460
3470DEF
FNmenu_markers(item%)
3480block10:=window%(menu_num%
):SYS
"Wimp_GetWindowState",0,block
3490start%:=discmem%+(marky%(0
)+16)-16:end%:=discmem%+(marky%
(1)+16)-1
3500newpos%:=discmem%+(marky%(
2)+16)-16
3510CASE item% OF
3520WHEN 0:IF
marky%(2)<marky%(0) THEN
start%:=marky%(2) ELSE
start%:=marky%(0)
3530IF marky%(2)>marky%(1)
THEN
nd%:=marky%(2)+marky%(1)-marky%
(0) ELSE nd%:=marky%(1)
3540FOR lp%:=start% TO
end%:?newpos%:=?lp%:newpos%+=1:
NEXT
3550FOR lp%:=start%-1 TO
nd%:PROCinto_array(lp%):NEXT
3560PROCblank_mks:sector_chan
ged%=TRUE
3570WHEN 1:FOR lp%:=start% TO
end%:?memend%:=?lp%:memend%+=1:
NEXT
3580IF marky%(1)=65 THEN
memend%:=16
3590PROCblank_mks:PROCupdatew
indow(window%(3),0,0,640,320)
3600WHEN
2:PROCsave_memory:PROCblank_mk
s
3610WHEN 3:FOR lp%:=start% TO
end%:?lp%:=0:NEXT
3620FOR lp%:=marky%(0)-1 TO
marky%(1):PROCinto_array(lp%):
3630NEXT:PROCblank_mks:sector
_changed%=TRUE
3640WHEN
4:memend%:=memstart%:SYS

```


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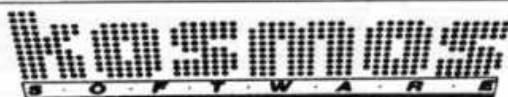
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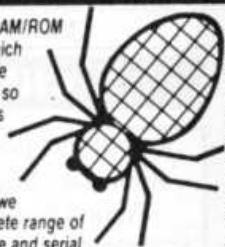
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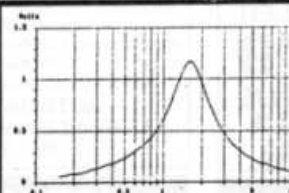
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"C" Competition Winners

Well folks, it was all a huge April Fool's joke – and believe me, it was hard keeping a straight face when we received all those irate telephone calls from readers enquiring about the competition – namely the last question! The Back Page can reveal that there was a deliberate mistake in the last question we set in the Beebug C competition in April.

Just to make things a little more complicated, Mary Branscombe – the sado-maso-

chistic competition designer, decided to throw in a couple of extra words into the last question thus effectively doubling the complexity of the questions set.

Not that it stopped any of you mind. We were still deluged by a pile of post cards – many of whom had spotted the mistake and correctly assumed that the sequence in question 16 was wrong. Curses foiled again!

The winners of the competition are as follows: *Peter Holt* from Stockport, *Alan Malkin* from Maidenhead, *Shareen Willis* from Devon. They all win a brand new copy of *Beebug C* for their efforts and logical thinking.

Name	Occupation	Wife	Destination	Order
Chris Clarendon	Cooper	Claire	Chichester	1
Clive Claremont	Chef	Chloe	Cheshunt	2
Clint Collins	Cobbler	Cleo	Canterbury	3
Colin Cooper	Comic Artist	Candice	Charing Cross	4
Charles Cobbler	Comp. Operator	Cathy	Cambridge	5

Answers to the C Competition after taking into account the additional alterations to question 16 – I hope you like it!

Mary Branscombe.

Fangs for the Memory

Clive (where's my Frank Zappa tape) *Grace* was secretly photographed sitting at his desk pondering the delicate subject of gaining an early promotion by biting the neck of Mark Webb, our hallowed Editor/Group Editor, and miracle worker (working with Clive is the miracle!). He suddenly recoiled when he discovered the worrying truth that Mark's only blemish in his unstained career is the fact that he is hopelessly addicted to tasting envelope adhesive!

Mark, on the other hand, upon discovering the fact that Clive occasionally turns into something shockingly resembling a were-

wolf, told Clive's nearest human next of kin; "We didn't really suspect anything, we thought the *Bonio* biscuits were just a petty indulgence, had we known, we would have passed his job application on to Database publications where he would have been more at home."

Clive is obviously miffed that his secret is out and was considering buying a nice little French bomb to poof ASP out of existence. Mark has, in the meantime, moved on to large heavy gauge manilla envelopes.

Dumb All Over (and a little ugly on the side)

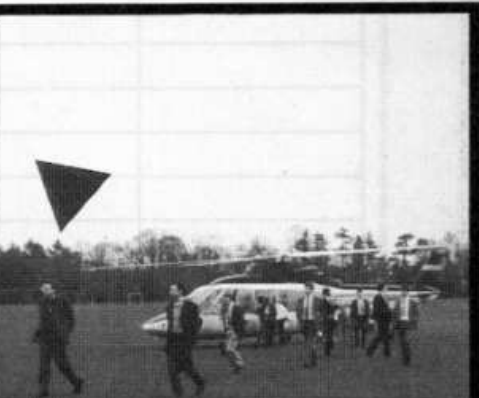
Stupid photographs time ladies and gentlemen. Kicking off with our delightful Assistant Editor (that's him on the right!) at the recent launch of *Vixen* an "all formats" game – it's funny though, there wasn't a BBC version in sight although we were promised a version was on the way by one of Martech's lackeys.

But I digress, the shindig thrown at the Intercontinental Hotel – Mayfair last month (note the "Amazonian" Yucca plants – snigger) was hosted by the delightful poodle in the photograph – she was playing (without too much difficulty) *Vixen* – the well built and ever so slightly top-heavy heroine of this, the latest in a long line of macho extravaganzas for pre pubescent mentalities. *Barbarian* she 'aint but Darrin

is a big softie when it comes to women with whips and fake furs – he goes all quivery at the knees and tends to go very very red.

She braved Darrin's truly awesome after shave ("It's Brut 33- honestly!") and posed for this shot next to our cherry cheeked cherub. After the session, Darrin was heard to wistfully say "If I had offered some money, perhaps she would have let me kiss her whip!"

Gosh Darrin, is that why you like wearing leather ties?



Watch the Skies

Is it a bird, is it a plane? No it's a group of hardened hacks off to a rather fab press launch via helicopter to Godalming in Surrey where we sampled the delights of a new database for the PC. The trip was great, as was the food. However not all concerned found the flight a pleasurable experience. Just as well Tony "Where the Hell's Watford this month?" Quinn was wearing brown trizers.

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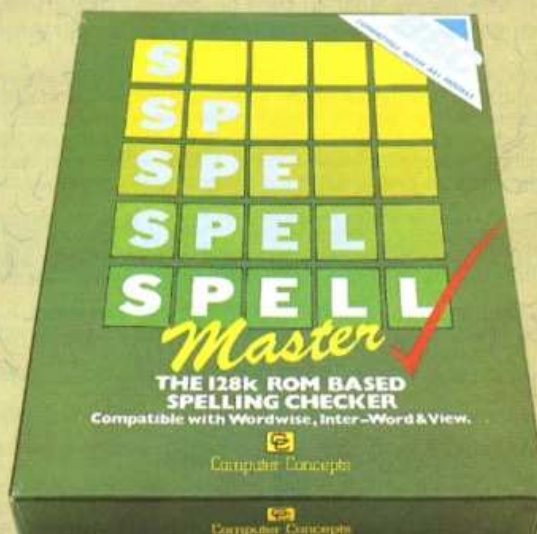
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